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VOL. II, No. 2 PARIS SEPTEMBER 1918

WAR MEDICINE

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RESEARCH SOCIETY REPORTS

THE EIGHTH SESSION OF THE RESEARCH SOCIETY OF THE AMERICAN RED CROSS IN FRANCE

July 26 and 27, 1918, at the Hotel Continental, Paris.

Major Walter B. Cannon, Chairman of the Research Committee, presided throughout the session.

The subject of the first meeting, Friday July 26, at 2:00 P. M., was "Treatment of Fractures of the Femur". It was discusssed by Major Sinclair, R. A. M. C., Lt.-Colonel Joseph Blake, M. R. C., Médecin-Major Leriche, and Médecin-Major Heitz-Boyer.

The subject of the second meeting, Saturday July 27, at 10:00 A. M., was "The Sources of Wastage of Men in War: with Suggestions for their Amelioration". It was discussed by Lieutenant-General Burtchaell, R. A. M. C., Colonel H. Ensor, R. A. M. C., Lt.-Colonel C. G. Brown, R. A. M. C., Médecin-Major Hautant, Major Cowie, R. A. M. C., Major-General W. M. Ireland, M. C., and Major Emerson, M. R. C.

The Subject of the third meeting, Saturday July 27, at 2:00 P. M. was "Transportation of Wounded Men". It was discussed by Colonel J. S. Gallie, R. A. M. C., Colonel H. Ensor, R. A. M. C., Colonel J. Poe, R. A. M. C., Lt.-Colonel R. S. C. Thomson, Médecin-Major R. Proust, and Colonel Percy Jones, U. S.

Following the meeting there was a demonstration by Colonel Gilchrist of a degassing plant.

FRACTURES OF THE FEMUR

Treatment of Fractures of the Femur. By Major SINCLAIR, R. A. M. C. The following is a detailed résumé of the paper:

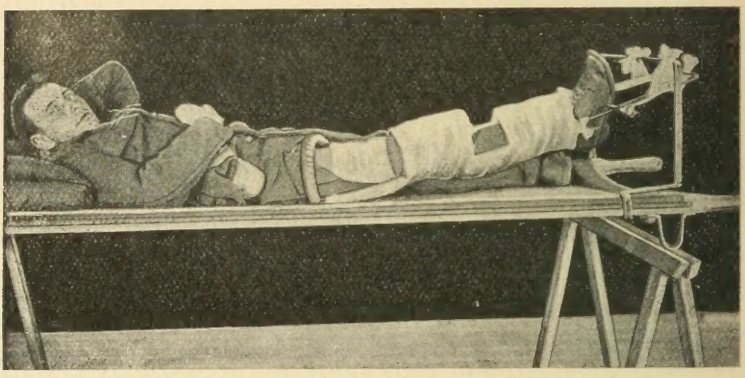
IN THE TRENCHES.

Arrest of Hemorrhage. The tourniquet should be applied just sufficiently to control the hemorrhage. It must be removed at the earliest possible opportunity at the field ambulance or C. C. S. and here the vessels should be ligatured, as great harm is done by prolonged or unnecessary application of the tourniquet.

Protection of the Wound. Do not attempt to clean the wound but simply apply the first field dressing to protect it from further infection.

Immobilize the Limb. The Thomas is the simplest and most efficient splint, in which every fracture of the femur, leg, and foot can be treated uniformly with good results at the front and at the base.

Apply the Thomas splint over the clothes, get the ring against the ischial tuberosity, with one hand round the patient's ankle extend the limb, and at the same time push the end of the splint up with



Skewer Extension suint Suspended on Stocker Bar.

your abdominal muscles, so as to get and keep the ring pressed home. Take the skewer in the other hand and pass it obliquely from the inner side between the patient's sole and the sole of the boot, in such a way that when it is resting on the side bar the foot is rotated outward. This conforms with the external rotation of the lower end of the upper fragment which assumes a position of repose in all fractures, and by fixing the foot prevents the conlinual rotation of the upper end of the lower fragment during transit. This movement at the upper end of the lower fragment tays open fresh channels for infection, not to mention the discom-

fort of the patient. Place a cork over the sharp end of the skewer. Pass two loops of bandage around the projecting ends. Make a fixation pull, passing the external bandage below and the internal bandage above their respective side bars, and tie off with a V-shaped depression on the end of the splint.

Support the thigh posteriorly by a bandage, passing from bar to bar. Fix the knee in the splint by padding all around, and encircling the side bars with the same bandage. Then continue this bandage zig-zagging from bar to bar, to support the leg posteriorly and fix the ankle in the same way as at the knee. Finally tie the skewer to the side bar.

Transfer the patient to a stretcher and suspend the limb to stretcher bar. This prevents the limb from being driven forward out of the splint, as it is when laid on a horizontal surface, and avoids an angulation backwards at the seat of fracture, thus protecting the soft tissues in the vicinity of the break from further damage.

Field Ambulance or C. C. S.

On arrival at the field ambulance or C. C. S.. X-ray if possible and give A. T. S. Remove clothing, cutting it away from the injured limb and remove the boot. Although the temporary extension to the boot can be very quickly applied and is of great service for a few hours, it will cause pressure sores on the dorsum if the pull be excessive or kept on too long. Ankle ties only give extension and do not fix the foot. Having taken off the boot, tie a bandage around the ankle and make this fast to the V depression at the end of the splint.

Adhesive Glue.

The following is a formula :

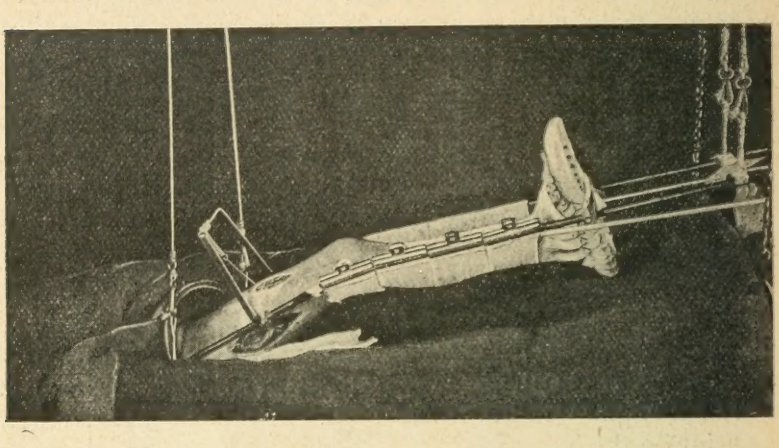
Very good glue, 50 parts;
Water, 50 parts;
Glycerine, 4 to 6 parts;
Menthol, 1 part.

The adhesive *per se* cannot cause blistering.

See that the temporary extensions are fixed and that the limb up to the field of operation is supported posteriorly.

Operation. The operation should be performed aseptically and, as Berkeley Mohynham says, "caress your tissues" with great gentleness. Do not make extensive excisions ; stop hemorrhage. Bone which is lying totally detached in the muscles may be removed, but

bone with attachments try gently and carefully to return to its old bed. Keep in your track and you will find your foreign body and cloth, if present. Make a dependent counter-opening in the posterior aspect of the thigh, with limb raised and body lowered, so as to insure drainage by gravity. Insert a half inch rubber drainage tube, extending from the fracture in a slanting direction towards the buttock and projecting about one inch from the skin. Prove the drain with about two ounces of normal saline; henceforward



General View. First Position Extension by Screws in Tibia.

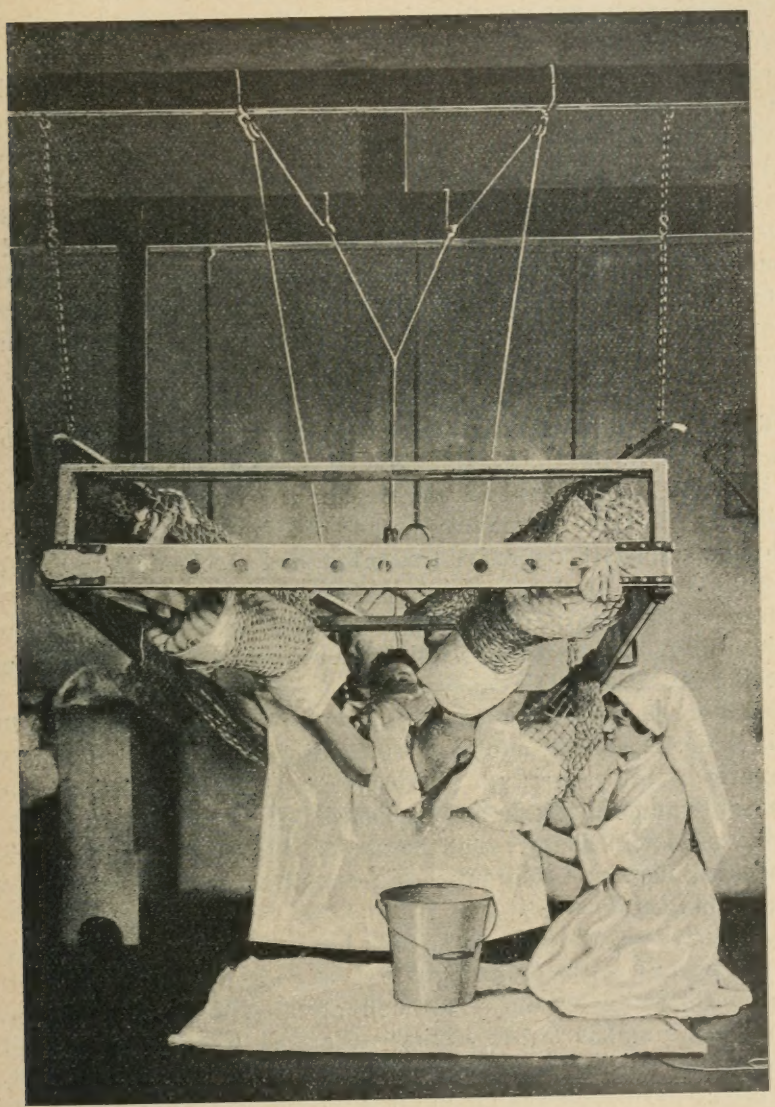
keep the wound dry and drain properly until the bone is repaired. Support the limb posteriorly with sterile flannel bands passed over the inner bar and fixed to the outer by sterile clips, the tube still being allowed to pass between.

Primary Suture. Should not be employed in evacuation cases. If sutured, cases must be carefully chosen and kept 14 days under the charge of the operating surgeon.

Base.

It is necessary to have a mobile X-ray plant, splint-room workshop, clean and septic theaters, besides an electrical department. The staff should have a special aptitude for this class of work and should not be moved even within their unit, as the best results always come from the wards where the staff is permanent. The first thing of all, the patient is sent to the X-ray; when he returns to the ward the wounds are redressed with a small dry gauze dressing, and temporary extension is applied by means of a bandage tied round the ankle and made fast to the end of the splint, the

limb is immobilized while it is being washed as at the C. C. S., and the extensions which were applied in a hurry are removed. The



Net Frame Showing How Dressing May Be Done.

Thomas splint is bent at the knee, extension prop fixed at the lower end, and four tape loops attached, two applied to the ring of the splint, below the side bars, and two to the side bars at the foot end.

Method of Reduction. If the case has a large buttocks wound the case is treated in a *Net Frame.* If the case has a marked swollen thigh, he is taken to the theatre and drained. All operations except amputations are done in the splint or net frame. To try and combat the shock after these operations, the author proposes to anastomose the femoral artery to the vein. The patient remains in the first position about seven weeks until the fractured ends are sufficiently held by callus and the limb is about one-half an inch longer than the other. The callus, if splastic, will bend gradually but will crack if bent suddenly, so angulations very frequently occur in the later stages. In large comminuted fractures with much bone loss the author has seen angulations occurring 18 months after injury. Comparative X-ray photographs ought to be taken monthly, which give very valuable information regarding bone degeneration, and destruction of sequestra.

Treatment of Fractures of the Femur. By Lieutenant-Colonel Joseph A. BLAKE, M. C. Colonel Blake said in part :

As Major Sinclair has said, the treatment of fractures of the femur naturally falls under three heads, each of almost equal importance, namely : transport, operative treatment, and mechanical treatment by splints or apparatus.

In regard to transport, the American Army has taken the ground that the wounded should be splinted on the field where picked up, and the splints for this purpose have been designed to occupy as small a space as possible and to be readily carried on to the field. This is the reason for adopting the folding half Thomas splint for fractures of the femur; and the transport of fractures has been so admirably and effectively accomplished under the careful teaching of the officer in charge, that the use of this splint is going to be continued, although it requires more skill to put it in place than does the full ring splint.

Although the splinting on the field has been well done, the same cannot be said of the splinting at the evacuation hospital, and, with due consideration of the stress under which the surgeons were working during the last few weeks, there has been room for much improvement. Every surgeon should make himself proficient in the use of the Thomas splint and it is not putting it too strongly to say that no surgeon should be promoted until he is able to put one on correctly. Until the surgeons at the Field and Evacuation Hospitals become more skilful it might be well to send teams to these hospitals whose only duty should be to see that the personnel are instructed and the splints properly applied.

There should be as little transport as possible for fractures of the femur. Unfortunately they have to be transported and it is important to know at what periods of their treatment transportation is the least harmful. If it were not for delaying the primary operation the best time would be before the operation. The next least harmful period is immediately after the operation before repair of the soft parts has commenced. Transport during the period of consolidation is extremely harmful.

Snug circular bandages should never be used for injuries of the thigh as swelling is more than apt to cause constriction, not infrequently promoting gas gangrene and leading to amputation.

The primary operation differs according to the time when it is performed. When done in the first eight hours before the bacteria have commenced to multiply throughout the wound, it should be confined to a paring away of devitalized tissue. Only detached fragments of bone should be removed, with the exception that in contamination of the medulla in fractures, when the wound is made by penetrating missiles, enough of the fragments should be removed to permit cleansing the medulla, but no more.

Primary suture should only be attempted in the most exceptional instances, and in these only when the patient is to be kept in the service of the operator and not evacuated.

Operations in fractures already infected must be done in a different way. The incisions must be long enough to expose fully the injured muscles and they must be inspected for some distance beyond the original wound. All muscle tissue showing signs of commencing gas gangrene must be excised. The wounds must be left widely open.

While not touching upon the indications for amputation, one must protest against guillotine amputation. It sacrifices an inordinate amount of skin, thus always necessitating a secondary amputation and it is well known that the skin plays no part in the dissemination of gas gangrene. It is believed that as far as drainage is concerned, it is inferior to the transfixion amputation by long anterior and short posterior flaps. In the latter method lateral incisions can be extended upward affording efficient drainage, or the posterior flap may be split without endangering the character of the stump as the bone is covered by the anterior flap alone.

The question of internal fixation is always arising in the operative treatment of gunshot fractures of the femur. In general it is to be deprecated. Occasionally in oblique fractures when there is fear that the fragments may become displaced in the interval between the operation and the adjustment of the limb in the apparatus for

definitive treatment, it may be justifiable to use an encircling wire which is to be removed within a few days. Methods which cause additional traumatism, and particularly perforations of the cortex through which infection may reach the medulla, should not be used.

The principles of mechanical treatment have been so admirably expressed by Major SINCLAIR that little can be added. His points in regard to bending the splint and reducing the fracture by using the bands stretched across the splint as a fulcrum are particularly valuable.

For traction I have always preferred the weights and pulley, believing that it is the only way by which the exact amount of traction can be determined; also to permit varying the amounts of traction according to the requirements of the case.

For instance a heavy weight and traction can be applied at the outset to reduce the fracture and then diminished to stress just sufficient to retain position. Used in this way the traction may be so diminished during the latter part of the treatment as not to cause any stretching of the ligament of the knee.

As to the method of applying traction, I use glued bands, Ramshoff's tongs, and the Codavilla pin. Direct traction with the tongs on the femur has been the most satisfactory. It is the most efficacious and does not interfere with massive movements of the knee. The Codavilla pin is used in cases in which the wounds are so low as to prevent the employment of the tongs. In these cases it is placed through the tibia just behind the tubercle. It has the disadvantage of pulling below the knee joint and preventing passive motion of the knee. It possesses no great advantage over the glued bands and is only used when the latter have caused blistering.

For splints the Thomas is the best except in high fractures with wounds about the glutial fold. In these cases the Hodgins is preferable. In using the Thomas it is bent to suit the case, the amount of bending depending not only upon the level of the fracture, but upon the manner in which traction is applied. The axis of traction should be more horizontal than that of the femur over the cross bands of the splint. Therefore when using the tongs or pin, the femur has to be more flexed than when using glued bands and therefore the splint has to be bent so as to produce the desired flexion. We have found that it is best to bend the splint a little above the level of the knee.

Counter balance suspension has been found to be a great help. With it the patient has a greater latitude of motion in bed; and in many cases of hip wounds, by means of a counterbalanced sling

under the body, the patient may readily be suspended in the air without disturbing his fracture.

Treatment of Fractures of the Femur. By Medecin-Major LERICHE.

The speaker remarked that the gravity of a fracture differs according to the distance from the front at which the inspection is made.

Fig. 1.

Fig. 2.

Fig. 1. — Normal Periosteum (at the right, diaphysis; at the left, fibrous bundles).

Fig. 2. — Condition of the Periosteum Immediately After Correct Sub-periosteal Resection. (From right to left: blood clot; bone-covering detached by the rugine but still adhering to the fibrous periosteum in the form of a layer of bony flaps; fibrous layer, with interstitial hemorrhages; fibrous periosteum, with the fibers retracted.

In a general way the nearer to the line, the more serious the fractures seem to be.

At an ambulance 6 kilometers from the line in 1917, while things were quiet, fractures of the femur gave a mortality of 66 o/o. 6 kilometers further back the mortality was only 32 o/o, and lately in a spot 100 kilometers from the line the mortality was nil.

The speaker referred merely to fractures observed during the first hours.

It was believed at first that indications for primary amputations

in fractures of the thigh had become very rare; but the figures just mentioned prove that it is not so.

At the present time it is considered that immediate amputation ought to be performed under the following circumstances:

Fig. 3. — Conjunctive Reaction in the Detached Periosteum (about four or six days after the use of the rugines). From right to left: young conjunctive tissue (fleshy granulations) forming in the blood clot; detached bone covering; young conjunctive tissue forming in the old fibrous periosteum; which is edematous with the fiber bundles breaking up and disappearing.

When a shocked patient has not come out of his shock within two hours after proper treatment.

When there is a lesion of the vessels of thigh, femoral artery, or popliteal vessels.

When the patient has been wearing a tourniquet for several hours. When a patient with a fracture of the thigh has had one on for three or four hours, the conservative operation becomes very serious and as a rule such cases die of septicemia in twenty-four hours.

When there are several wounds all of which need urgent treatment. In those cases amputation is very necessary for it shortens the intervention.

Fortunately the majority of fractures are not so serious, and recovery can be obtained by conservative treatment. In cases without shock spinal anesthesia is employed. For shocked cases the speaker uses ethyl chloride or ether in small doses.

In the intervention itself, there are three points to be considered:

(1) Treatment of soft parts — this must be carried out on the same lines as for ordinary wounds of the soft parts; with excision of all torn tissues, and progressive immediate hemostasis as the bone is approached; otherwise a great number of veins which bled at the time of the operation stop bleeding at the end of it, a condition which might cause secondary hemorrhage. The

incisions vary according to the tract of the projectile. The object is to have a clean surgical wound. It is only then that the bone can be treated.

(2) As to the treatment of the bone, the author believes that discussions as to the extent of esquillectomy are useless. The object of intervention is to follow out the tract and to establish correct anatomical conditions, and the treatment of the bone must be judged accordingly.

He considered three cases :

a) The projectile has not reached the bone; after the incision of the soft parts the projectile is reached and behind it there is healthy muscle, therefore it is not the projectile that has caused the direct fracture of the thigh. This first variety is that of accidental fractures in wounds of the thigh.

b) The projectile has come in direct contact with the bone, has broken it, but has not penetrated inside. Such fractures have been called by military surgeons " fractures by contact ". These cases are not very serious. The only thing to bear in mind is that the projectile might drive in debris of clothing or foreign bodies which must be sought out. These fractures by contact must not be confused with the third category which includes real war fractures.

Fig. 4. — New Bone Formation (about ten to twelve days after the use of the rugine). (From right to left : new bone tissue pushing into the granulating tissue on the interior face of the periosteum; bony covering incorporated in the new bone; new bone developing excentrically in the old fibrous periosteum; the beginning of new periosteum generation, showing the development of new bundles of fibers).

(*c*) The projectile has penetrated into the bone and has come out on the other side. The object of the operation must be the same as in the treatment of all war wounds. The complete tract of the projectile must be cleaned so that no foreign body is overlooked.

The bone is widely opened. The medullary canal is cleaned out and loose splinters removed. The adherent splinters must not be removed as long as the tract to the projectile is open to view. But such is not the case when the projectile has passed inside the medullary canal and the splinters have gathered by muscular contraction. However, enough bone must be taken out to allow the thorough cleansing of the medullary canal.

One or more splinters of bone are removed in order to open the medullary canal to view. One might fear, by removing those splinters, to diminish the value of the osteogenetic reparation, and by removing one or two splinters to compromise later solidity of the bone and cause pseudarthrosis.

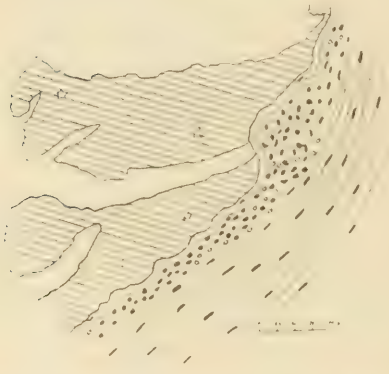


Fig. 1. — Fragments of Bony Covering Adherent to the Detached Periosteum.

If the subperiosteal operation is performed, it must be done in a special way, with a very sharp instrument, and on the deep side of the fibrous periosteum a small amount of bone dust must be left.

When the operation has been carried out in this way, osteogenesis begins very fast. The author has studied this matter very thoroughly. On the fourth day, bone started to grow around the bone dust and as early as the ninth day an X-ray picture could be obtained, and on the thirty-fifth or fortieth day, consolidation was generally obtained. This kind of intervention makes possible a very large callus, which grows on one side of the bone and which gradually becomes smaller. But never has the speaker seen pseudarthrosis occur.

Leriche thinks that in cases of fracture, there is no need for primary suture. He has performed several but has sometimes been obliged to reopen the wound.

When the operation on the bone and the soft parts is finished, he puts on an aseptic dressing and immobilizes the limb in extension and suspension. He renews the dressing three days later under anesthesia, and, if the wound looks healthy, sutures it. The suture is performed in several layers. If the case is not very severe, the suture can be started on the 3rd day, continued on the 5th, then on the 7th; and the operation is generally completed on the 10th day.

The author thinks that delayed primary suture can be done

Periosteum Invaded by Ossification *10 days after injury*.

Coloration
de Safran
de Pierre Masson

Cir. 60
1

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of HENRY BOYD

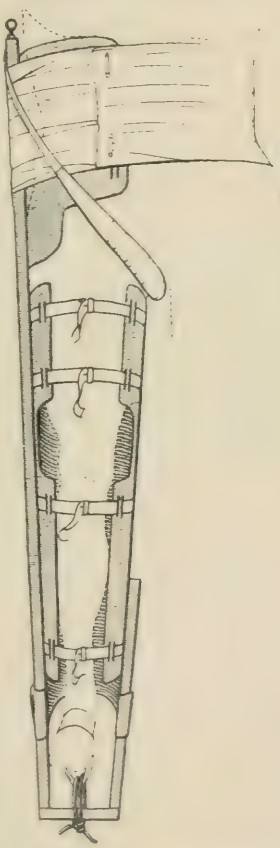
Bony inflammatory neoplasma (osteoplastic exostosis) developing from periosteum. Adjacent bone *affected* with ostitis, and penetrated with deep bone proliferation into the periosteum, which has become greatly thickened and vascularized. These proliferations end in regular "growth points" in a condition preceding ossification. In the interval of the anastomosed proliferation are formed several medullary spaces large and irregular in shape, containing vessels. On the edge of the old bone is differentiated a thin layer of new bone, where two of the trabeculae begin. The rugine should pass at this level in the so-called subperiosteal resection, which procedure, in reality, is *bone section*. Since the rugine must pass between the old inflamed bone and the trabeculae of newly formed bone in the periosteum.

under these conditions, in almost all fractures with wound of the soft parts, and almost all the fractures by contact, except that delayed primary suture in fractures with through-and-through wounds is successful in only 30 to 35 o/o of the cases.

The author communicates the following figures, based on observations extending over a six months period: 17 cases of fractures of the femur, out of which there were 4 primary sutures all successful; 6 delayed primary sutures, also all successful; and 7 fractures with through-and-through wounds, only 2 of which could be sutured after 10 days. The proportion, it can be seen, varies in the three classes.

Treatment of Fractures of the Thigh. By Médecin-Major Heitz-Boyer. The speaker limited his remarks on fractures of the thigh to five or six special problems in which he had been able to affect some improvement over previous methods of procedure.

Evacuation Preceding Hospitalization. For the immediate transport of fracture cases 30 or 40 kilometers behind the lines, an apparatus affording complete immobilization is essential. The apparatus invented in the service of Heitz-Boyer by Pouliquen affords the necessary immobilization to the maximum degree. The member is supported by a grooved splint, completed by a wooden frame, the outer end of which extends to the armpit.



Pouliquen Splint and Frame.

Extension is performed on the foot by a rubber band; and counter-extension, by a supple band passed obliquely over the groin and fixed under the armpit. This apparatus is the only one which immobilizes the two articulations above and below the fracture, immobilization of the hip being essential in cases of high fractures of the femur. Moreover, it is made of wood, is inexpensive, easily constructed, and may even be improvized anywhere.

The Removal of Splinters. This important point in operative

surgery has given rise to a divergence of opinion among French surgeons, but Heitz-Boyer thinks that now the solution to the problem has been found.

The removal of splinters where the fracture of the femur has been large ought to fulfil a double mission : — (1) To stop or hinder infection at the start. (2) Later, to foster bony regeneration. The dispute is as to whether, in order to accomplish regeneration, it is necessary to perfom primary preventive ablation of the adherent fragments (for all are agreed that loose splinters should be removed) or, on the contrary, whether only a limited resection be made during the first hours after the injury with a view to making a more extensive secondary resection. There is a further dispute, as to whether primary or secondary ablation affords the best prognosis for complete bone regeneration?

A. With regard to *disinfection*, all are agreed that with the means now available for surgical disinfection, the seat of a fracture can be disinfected without extensive bony damage; just enough bone ought to be removed to ensure good drainage. On the contrary, the soft parts must be very largely excised and carefully flattened after being thoroughly scraped. As for the spine, Heitz-Boyer maintains that from the anatomical and bacteriological point of view, it is untouched, even as far as the confines of the fracture itself; experience having taught him that contusion and infection of the medullary tissue are usually limited to the first centimeter or centimeter and a half above the fracture. It is therefore useless to perform curettage of the spine.

In order to ensure post-operative disinfection of a fracture, Heitz-Boyer prefers, during the first days, the use of ether-alcohol-iodoform which, thanks to an injection renewed morning and evening, permits of the dressing's being left in place for four or five days. The Carrel treatment is then employed, with its daily dressings and non-traumatizing methods.

B. With regard to *bony regeneration*, this, of course, can only take place if the surgeon has left in the wound the bone generating elements. In France it was thought until recently, according to the works of Ollier, that the periosteum was such an element.

According to this belief large bone resections ought to be performed sub-periosteally; that is why Leriche, at the beginning of the war, advocated extensive primary sub-periosteal removal of splinters. But Ollier himself had observed that when this was performed a few hours after wounding, although in a child it would be followed by bony consolidation, in the adult the result was negative. He therefore came to the conclusion that the normal

condition of the adult periosteum was one of sterility, and that it did not become fertile until inflamed, i. e., on the 4th or 5th day after an open fracture. Hence the necessity, according to Ollier, of waiting for the "secondary" period before performing extensive subperiosteal resection.

Surgically speaking Ollier was right, as the numerous pseudarthroses which have taken place as a result of the technic previously recommended by Leriche. The theoretical explanation, however, which Ollier gave was wrong, for in the speaker's opinion, at no time of life does the periosteum generate bone. "*Only bone itself generates bone*". This theory, when defended last year by Heitz-Boyer together with Scheikewitch before the Académie des Sciences, gave rise to violent criticism in France. It ought not, however, to surprise American surgeons, who, for several years, have raised doubts concerning the osteogenetical properties of the periosteum. If once this conception is admitted, the whole question of esquillectomy and of resection in general, is greatly clarified. The three accompanying diagrams show, indeed, the result of a subperiosteal resection: (1) upon a young bone during the process of growth; (2) upon a matured bone without inflammation; and (3) upon a matured bone in a condition of inflammation on the 4th or 5th day after injury. *In only one of these three cases, that of the normal matured bone* (see fig. 2), *the resection was genuinely subperiosteal. In the two other cases* (see fig. 1 and 3) *the rugine passed through the bone itself.* It could not have been otherwise, because of a

Fig. 1. – Periosteum of Young Bone in Process of Growth after Sub-periosteal Rugination.

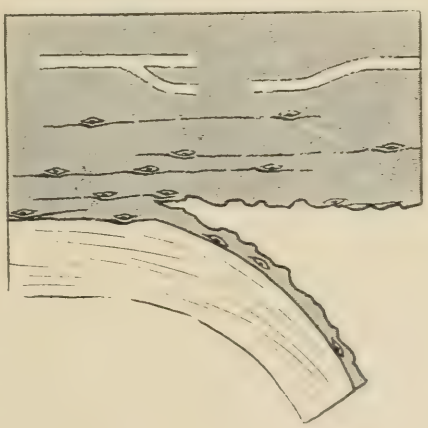


Fig. 2. — Periosteum of Normal Matured Bone after Sub-periosteal Rugination.

very important anatomical fact, the significance of which seems to have been neglected and upon which Heitz-Boyer insists. Indeed, on the young normal bone, as on the inflamed matured bone, the exterior surface is not smooth as in the case of an adult bone; neither has it the hardness peculiar to bone. It is very irregular, and presents a quantity of fragile and brittle granulations which invade the adjacent periosteum and tend to push it back (see fig. 1 and 3). In the case of young bone this anatomical fact is set forth in all books on histology. On a matured inflamed bone, as is the case in a war wound of only a few days standing, the histological examinations of Heitz-Boyer and Sheikewitch have proved, after the fourth or fifth day of a wound, that the injured and inflamed bone presents a double series of lesions of *rarifying* ostitis (see color plates) in the bone itself, with trabeculae and softening of the fundamental tissue, *proliferating* ostitis growing outside the bone itself *irritating* and constituting a genuine "inflammatory bony neoplasia" which invades the periosteum and quickly creates an embryonic medullar bone layer which is connected with the old bone by thin bony attachments. It is at the level of these that the rugine should pass in the process of subperiosteal resection — that is, not at the point where the bone and the periosteum unite, but *at the junction of the old bone and the new*, which has, as it were, forced back the periosteum. Therefore on a young growing bone as upon a matured inflamed bone, a layer of newly formed bone (either physiological growth or pathological reparative bone) should always be removed with the periosteum: Ollier's technique in similar cases is, strictly speaking, bone resection. On the contrary, in the case of matured bone without inflammation (as in primary traumatic esquillectomy), the surface of the bone upon which the rugine has to act is hard and smooth for there is no proliferating or rarifying ostitis; the rugine must then pass between the bone and the periosteum: the resection is then properly speaking subperiosteal.

Fig. 3. — Periosteum of a Mature Bone Inflamed (at the Level of a Fracture, the 4th or 5th Day after Injury) Following Sub-periosteal Rugination.

From the point of view of future bone regeneration, Ollier perfectly understood what was taking place in the three instances mentioned : after the subperiosteal use of the rugine on a healthy bone, no bone growth occurs, whereas in the other two cases, that of the young growing bone and that of the matured inflamed bone, bone regeneration takes place.

Surgical conclusions : If regeneration is required, *all esquillectomy or traumatic resection must consist " in cutting the bone itself "*. In the case of mature bone in fractures of five days' standing, that is in cases of primary traumatic esquillectomy, the classic technic must be modified, or " exaggerated ", as Leriche has recently said, by forcible penetration into the hard cortex of the bone, cutting away with a well sharpened rugine, repeatedly renewed, a series of superficial bony parings, in such a manner as to change the condition represented in figure 2 into that shown in figure 4, or, in other words, to transform a subperiosteal resection into a genuine bone resection, which may then be followed by bone regeneration.

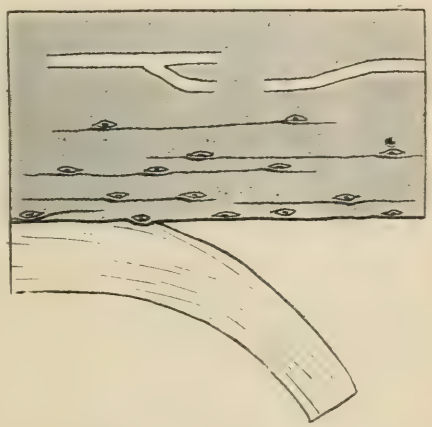


Fig. 4. — Periosteum of an Uninflamed Bone after Rugination of the Bone Itself.

In the light of these conceptions, Heitz-Boyer reaches the following conclusions on the subject of esquillectomy in fractures of the femur. A primary esquillectomy may suffice to insure disinfection, although it is limited in extent: even if a large resection is required, it will always be strictly in the form of bone resection according to the technic of Leriche. A secondary esquillectomy must always be extensive, and is, of course, bone resection, even when the so-called classic subperiosteal technic is employed. At the time of operation, the choice as to whether esquillectomy should be primary or secondary, extensive or limited, will be determined by the *time* and *place* of the operation. (a) In times of moderate activity, if the necessary equipment is at hand, and there is a sufficient number of available rugines, and if the operator is familiar with the new Leriche technic, he will find primary bone resection the procedure of choice, because it suppresses infection more certainly than any other technique, while at the same time it

insures the renewal of the bone substance, even after extended bone destruction; in short, it permits post-operative care by simpler and more rapid methods. (b) During times of great activity, on the contrary, or when the equipment is insufficient, or if the operator is not familiar with the Leriche technic, primary esquillectomy should be attempted, if at all, on a very small scale: such treatment will often prevent serious infection and may be supplemented a few days later by a large secondary esquillectomy.

Immediate or Secondary Closure.

Heitz-Boyer has succeeded in the practice of primary suture for fractures of the femur; but he sees in this procedure no great advantage over secondary or "delayed primary suture" (Pierre Duval), which leads to the same results a few days later, but with much more certainty.

Instrumental Technic.

Heitz-Boyer has been led to introduce a wholly new set of instruments for the treatment of fractures, especially of the femur, for it is frequently necessary, in a large swollen thigh, to penetrate to the depth of 10 or 15 centimeters in order to reach the two diaphyseal fragments and the intervening splinters which constitute a serious danger to the large vessels. This set of instruments consists of:

Spreaders with a spring attachment.

Splinter forceps which clasp the splinter firmly and hold it automatically.

A rugine with a curved handle, adapted to the concavity of the hand.

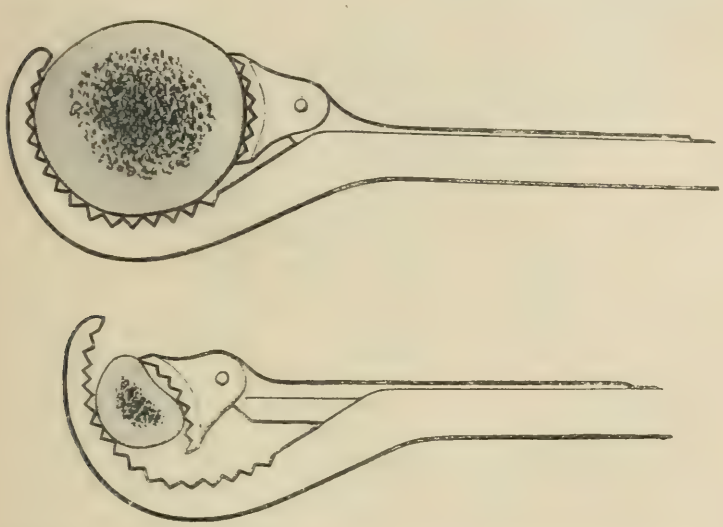
Daviers of a new model, intended to make the instrument less awkward in the wound. This change consists in an arrangement whereby one of the handles slips inside of the other, in such a manner as to facilitate the closing of the forceps with the help of

Davier with Parallel Grip Responding Instantly to Pressure.

a thumb screw, thus causing a minimum of inconvenience and loss of time. In this manner the Davier is suited to all conditions of the wound and gains easy access to the seat of the bone injury. It is so arranged as to provide any manner of grip, or to permit the

male portion of the grip to be used as a crochet for searching out fragments in the wound.

A *guide-réducteur*, to render the fixation of the reduction, and fixation of fragments easier and almost automatic. This appliance is inserted between the Daviers when each is attached to one of the bone fragments. The *guide-réducteur* is composed of two parts: a) a central and transverse portion constituting a point of leverage between the two Daviers, and transforming each of them into a secondary lever (in this manner the surgeon finds his strength infin-



Showing How the Davier Adapts Itself to Bones of all Shapes and Sizes.

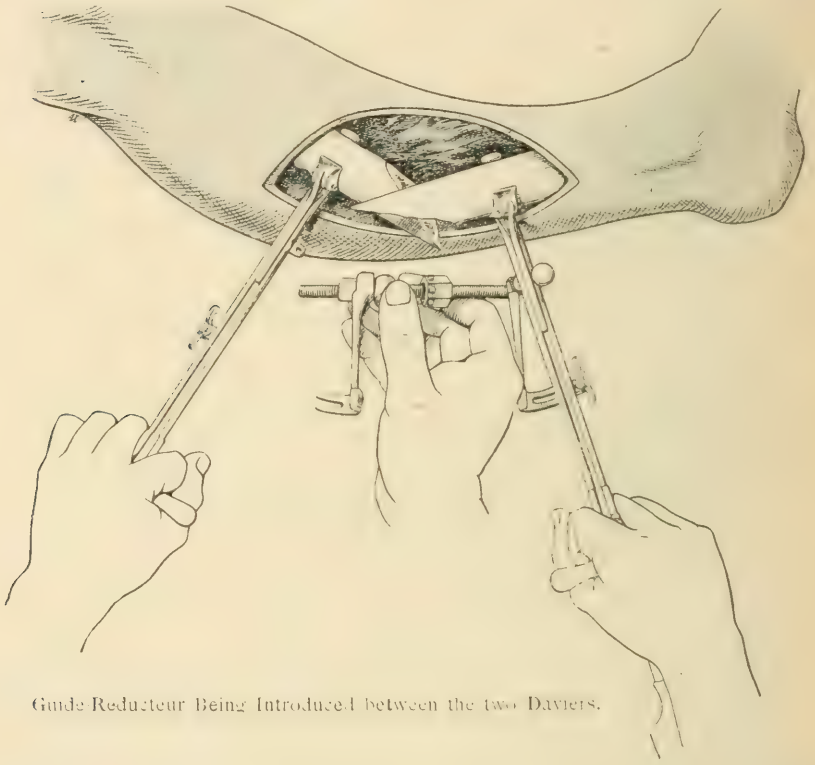
itely increased); (b) two lateral parts, branching off at right angles from the preceding, and consequently parallel to each other. It will be sufficient to bring each of the Daviers into contact with one of the two parallel branches, in order that the two fragments seized by the Daviers may be properly reduced end to end: this result is brought about automatically and almost mathematically[1]. The fragments may be fixed in this position by locking the Daviers upon the lateral branches of the *guide-réducteur*. This manner of fixation at some distance from the seat of the fracture, thus left completely exposed, permits of the practice of every kind of osteosynthesis.

Equipment.

The suspension appliances contrived by Blake are excellent:

1. This automatic reduction takes place in accord with the mathematical principle that lines which are perpendicular to parallel lines are parallel to each other.

however, for treatment in advanced hospitals and in the treatment of very grave fractures of the thigh, Heitz-Boyer employs a frame of his own with the Delbet ischiatic and trochanteric points of rest. This frame opens somewhat in the manner of a compass, and makes it possible in three minutes, after the operation has once been completed, to adjust the appliance to the thigh on the operation table itself. On a level with the thigh the lateral branches



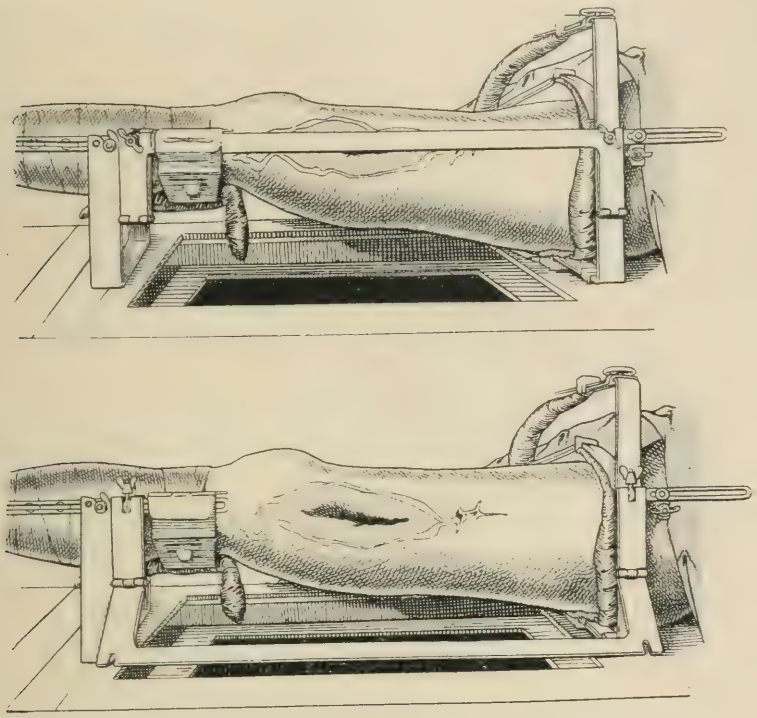
Guide Reducteur Being Introduced between the two Daviers.

may be opened out on both sides in such a manner as to make the wound completely accessible: this arrangement is helpful in dressing, in maintaining asepsis, and in radioscopic investigation. By a special arrangement at the end of the frame, weight extension may quickly be exchanged for spring extension, thus allowing the patient to be transported without the least change in the extension.

Late Bone Deformities.

Heitz-Boyer called attention to a late complication in the case of serious bone damage of the femur, which has not previously been reported. When several centimeters of bone growth have taken place and appear to be consolidated, in the third, or sometimes

as late as the fifth, month, marked deformities are to be observed. These are to be explained by the evolution of the osteogenetic processes which, as Heitz-Boyer and Sheikewitch have shown, pass through four successive stages : " pre-ossification ", medullar ossification, Haversian changes, and final development. While the



Frame for Fractures of the Thigh, Permitting Free Access to the Wound.

bone is in a condition preceding that of the Haversian changes, it has not as yet reached a stage of consolidation, and may foreshorten or be bent. Unfortunately it is not possible to know the precise moment when the Haversian changes take place, and hence it is necessary to observe most carefully all fractures of the femur for four or five months after the injury.

WASTAGE OF MEN IN WAR

Wastage in the British Army. Lieutenant-General BURTCHAEL, D. M. S., R. A. M. C. The speaker, after a word of hearty appreciation of the services of American medical officers with the British

forces, which is printed among the editorial comments, spoke as follows:

Wastage in an Army may be looked at from a great many points of view — the net wastage or total loss may be taken in relation to either the entire strength in the field or in relation to the front line units alone. Formerly we considered wastage only as affecting the fighting troops. Now the number of men employed on labor behind the fighting line has assumed such large proportions it is necessary to watch wastage in that element as well as amongst fighting men, and to have regard to the fact that a fairly large proportion of the men who drop out as non-effectives from the fighting ranks go towards forming efficient units in labor groups.

Ordinarily wastage or loss of fighting strength is caused in one of two ways, that is to say, by casualties in battle, or through sickness. The proportion of wounded to sick in the British Army last year in every thousand men admitted to hospital was 374 wounded to 626 non-wounded or "sick".

Primary wastage from wounds cannot be controlled by the Medical Service, but it is possible to influence the net loss that might occur from wounds by adopting certain procedures and lines of treatment with a view to getting men back to duty in the shortest possible time unless their injuries are such as to cause permanent incapacity for military service. In looking at the tabular statements of the disposal of sick and wounded you must remember that the term "sick", as here used in contra-distinction to "wounded", is really a misnomer as under that heading are included all forms of injuries other than those caused by weapons in action as well as disabilities which would usually be classified as surgical rather than medical. Also no great epidemic influenced the figures. Fortunately there has been no serious outbreak of epidemic infectious disease in the British Armies and we have not had to concern ourselves with wastage from that cause. However, in an Army one must be constantly on the look-out for the possibility of extension into epidemic form of the principal infectious diseases, nearly all of which are permanently represented by a few cases, and we have to guard against the introduction and spread of the germs of diseases not usually present. Infectious disease, if uncontrolled, might be the cause of a tremendous wastage. As a matter of fact the only infectious disease of any consequence from the point of view of temporary loss of strength that we have experienced was the recent epidemic of influenza which for about a week assumed serious proportions. It spread rapidly and, although men were only off duty from 4 to 7 days, the numbers affected were for the moment serious

in relation to the military situation. Fortunately it passed off quickly.

The total wastage in the British Armies in France is represented by deaths and evacuation to the United Kingdom — and the numbers lost have to be replaced by reinforcements. As a matter of convenience these numbers are watched in their relation to the disposal of all cases that come under treatment in the Casualty Clearing Stations and Base Hospitals combined, and not directly in relation to the total strength of troops — but I may say that the daily wastage per 1000 of strength is small and generally below the figure usually taken as normal. On the above basis the rates per 1000 of hospital cases are :

	All cases.	Sick.	Wounded.
Discharged to duty	413	521	232
To Medical Board	56	82	18
Evacuated	502	391	682
Died	29	6	68
Totals	1000	1000	1000

Factors other than the actual physical condition often influence the numbers transferred to England. For instance, temporary pressure on the bed accommodation in times of battle sometimes results in cases being evacuated which would be retained in France and come up for disposal locally in normal circumstances. Medical Board cases are those of a doubtful nature which are seen for assessment by Standing Medical Boards as to the category of physical fitness in which they should be placed. About 20 per cent. of all such cases eventually become category "A" or fit for General Service; otherwise they pass into the "B" class and are allotted to employments other than active combatant duties.

All casualties whether through wounds or sickness occurring in an Army established in the front line must be replaced from the base by reinforcements which are held in readiness at various Depots. These reinforcements on arrival in France are inspected for infectious diseases and for various disabilities of a general nature which may cause rejection for service at the front.

If we had to deal only with a normal man, free of any defect, he should never become a casualty from sickness unless he is brought into contact with infection, given infected food or drink, or in the course of time falls a victim to disease due directly to rigorous weather or other conditions incidental to front line life. But as a matter of fact, few men are absolutely normal and no one knows how many men out of a given number are really normal. Many

have slight defects which existed on enlistment and which may easily be aggravated by exposure and cause incapacity to carry on. This class produces the greater part of the so called "sick". Only one or two conditions which we know to be preventable, such as trench fever and P. U. O., give a high percentage in the total sick wastage. Thanks to the work of the Commission appointed by the American Red Cross to collaborate with the British Committee, we now know the cause of trench fever and it may be possible to completely eradicate it as a source of wastage.

In the front or battle line the soldier comes under the care and supervision of the regimental medical officer, and whether he falls out to swell the sick wastage figure of the unit or not depends to a very great extent upon the care, experience, personality, and knowledge of men as well as of medicine which this officer brings to bear on his duties. The proportion of wastage varies in the front line directly with the aptitude of the unit medical officer. Some medical officers are able to keep the men fit and cheerful and in the line by taking an interest in each individual by constant inspections and by making light of the ailments which are of little consequence.

On the other hand those medical officers who do not get in touch with their men and do not carry out the customary inspections of a sanitary or hygienic nature are soon surrounded by men who readily grow sick. At all times there are certain men in front line units who feel weary of war or a bit jaded and tired, or who have genuinely enough a pain here or there. The officer who is not in touch with his men often takes some quite insignificant symptom to be an indication of real sickness and passes the soldier back for observation. This practice results in men being constantly passed back who would have readily carried on their work if the medical officer had taken the line of cheerful encouragement. A regimental medical officer has a splendid opportunity of achieving success by endeavouring to produce a good psychological effect upon his men.

It is very interesting to investigate the problems which lie behind the factors which cause a man to "go sick" or not. One of your most distinguished surgeons brought before us some time ago a scheme for investigating the psychology of the soldier in the various circumstances in which he may be placed — when in the trenches, when going over the top and even at the moment when he is plunging a bayonet into the stomach of an enemy. Unfortunately the practical difficulties in the way were great and the scheme has not yet been put into operation.

As regards the proportion of men who on passing out of hospitals

and convalescent depots are sent to the Medical Board depots for physical classification, the disabilities per 1000 of all cases which give the highest ratio of entries into the " B " class are age and rheumatism 150, various conditions returned under the heading V. D. H. or D. A. H. 120, debility and anemia 100, old wounds or injuries 70, defects of vision 70 and myalgia 40. These terms are often wrongly applied and very often they do not represent correctly the actual disease or true disability from which a man may be suffering, but that is unavoidable when dealing with very large numbers of men often passed rapidly from the front to the base at times when there is no time or indeed necessity to enter a more exact diagnosis. Some of the conditions just mentioned, such as doubtful rheumatism, minor irregularities of the heart, debility, slight injuries or chronic affection of the joints, would ordinarily justify us in eliminating men at once as not fit to be sent back to the front at all. But that is not always a good policy. In many instances it is best to make little of a man's disability and pass him into the stream of reinforcements. Possibly any doubtful man may come back, but a large number of semi-defectives sent out as " A " do stick at the front and do not come back. Men unable to carry on, on account of such disabilities as hernia, piles, and deformities, are not sent back to the base through hospitals, but are passed down from the front direct to the base depot and from there they are brought before the Medical Board. If the Board does not agree with the judgment of the divisional medical officers, the medical inspector of drafts is informed and he, acting as a liaison officer with the division and comparing the conditions of the man assumed to have been wrongly assessed at the front with those of other men reviewed, endeavors to bring about an understanding as to the types of disability and physical conditions of a defective nature which justify a man's being retained at the front for duty.

Convalescent Depots give a very large yield of fit men — some 800 out of every thousand passed into the depots from hospitals. There are many important points concerning the control and treatment of men in these convalescent depots. The object is to take men out of the hospitals and put them through an institution run on military lines, where they are medically supervised, but otherwise treated as soldiers and not as sick or non-effective men. Measures are used to get them into fit condition both physically and mentally and to keep up a military atmosphere. They attend parades and are given physical exercises, route marches, etc., but each exercise is of short duration. They get good food and plenty

of amusement — a band is an essential. But above all, young active medical officers, if possible those who have had experience in the front lines, are placed in command. It is their duty to get into personal touch with the men so far as possible, to join in their sports, march out with them, and at the same time closely observe and assess the condition of each man. When men stay too long in hospital they frequently become depressed, hospitalized, and temporarily degenerate mentally. Some persons, especially sympathetic nurses, are inclined to keep patients too long in the hospital. This is not good for the individual man or his unit. Perhaps too few of those who directly or indirectly influence the stay of a man in hospital, consider that every day he is unnecessarily detained there some one else must do his work. The policy is to get every man up and about and out as soon as possible and make him feel that he is a soldier and not a sick man. To keep men cheerful and happy is half the battle and is the kindest and best of treatments for all those with temporary or more or less imaginary illnesses. A man's mental outlook should be put right before he is passed out of hospital or out of medical charge.

I have just given you an outline of the system through which men circulate from the fighting ranks to hospitals and back again — some of the officers who control various points in that system will tell you something of the details which I have not touched upon.

Wastage from Diseases Due to Lice. Colonel H. Ensor, R. A. M. C.

The speaker said in part :

A very considerable source of preventable wastage from the divisional point of view is disease due to lice. In this group of sickness are (1) trench fever, (2) impetigo and I. C. T.

With regard to trench fever, this disease was of very great interest as it is the one disease which can fairly be said to be entirely new to medicine and to have been discovered as a result of this war.

The earliest work on it was, the speaker believed, done by Captain J. W. McNee, R.A M.C., who first transmitted trench fever to healthy men by the inoculation of the white blood from cases of this disease.

He also succeeded in reproducing the disease by the inoculation of washed red corpuscles, but failed with the blood plasma when hemolysis of the red corpuscles had occurred. Later the American bacteriologists succeeded in reproducing the disease by the inoculation into healthy men of plasma, urinary deposits, and the sputum

from cases of trench fever. They also proved definitely that lice which had fed on cases of trench fever were the agents by which the disease was spread, and that it was the chief means of the transmission. They succeeded in reproducing trench fever in previously healthy men by means of rubbing the excreta and pounded up bodies of lice which had fed on cases of this disease, into scarified areas.

Captain J. F. Smith, R.A.M.C., has also recently called attention to the fact that the incidence of trench fever is much greater in men suffering from skin lesions due to pediculosis than in men suffering from skin diseases due to other causes.

The relation of lice to trench fever may be considered to be proved.

Impetigo and many cases of what is known in the British army as I.C.T. are also due to the irritation caused by lice and scabies. They can both be said to be diseases caused by the patient's scratching, thus bringing about a streptococcic infection of the skin. The speaker believed, at any rate, that at first the infection was streptococcic. Later the flora might be mixed.

The measures to be taken with regard to the prevention of these sources of wastage must obviously be those which exterminate lice among the troops of a division.

The extermination of lice under such conditions is far from easy. It is attempted in the field by means of bathing the troops and issuing to them clean underclothing, if possible, at least once in every ten days. With this object in view, baths are established in the divisional area, and laundries as near at hand as conditions permit.

Simple bathing of the men and the issuing of clean underclothing is, nevertheless, not enough. We know that lice habitually deposit their eggs on the body hair, particularly on the pubic and axillary hair. To destroy these eggs it is necessary to swab the parts after bathing with some solution calculated to do so. Hydrarg. perclor. 1/2 gr. dissolved in 1 oz. 2 o/o acetic acid will do this. All men after bathing should have their pubic and axillary hairs swabbed with this solution. No cases of irritation have occurred from its use so far as the speaker was aware. Shaving of the body hair is very strongly objected to by the men.

Even when this has been done, the men are far from lice-free. Lice deposit their eggs in the seams of the men's trousers, and in bad cases of pediculosis the speaker has seen them in the seams of the jackets. The sterilization of the men's service dress must then be carried out at the same time as they are bathed. This is the great difficulty from a divisional point of view. Each division of

the British army has one Foden lorry disinfector attached to it, but as all the men's dirty underclothing has to be disinfected in the divisional area before it is sent to the laundry, the Foden lorry disinfector has more than enough to do to disinfect this underclothing, and it is not available for disinfecting the service dress of the men.

It has been attempted to destroy the lice and the eggs in the service dress by means of ironing the clothing, paying particular attention to the seams. Ironing, even when skilfully done, is not satisfactory. Hot irons will kill the lice, but it is very doubtful if as many as fifty per cent of the eggs are destroyed by such means.

At present the sterilization of the men's service dress by means of hot air is being largely carried out by divisions in the field. Captain Jacobs, R.A.M.C., devised an efficient, though perhaps a little complicated, hot air chamber for this purpose. The best and most simple one the speaker has ever seen is one devised by Captain Orr of the Canadian medical service. The living lice and their eggs are destroyed in about twenty minutes by exposure to a temperature of 60° C. and Captain Orr's chamber is said to produce a temperature much higher than 60 ° C. One of these chambers is installed at each divisional bath and, as the men are bathing, their service dress is sterilized in the hot air chamber.

Clothing sterilized by such means is dry and warm, and can be put on immediately.

The objection to this form of sterilization is that the apparatus is not mobile, and requires a considerable time to erect. In consequence, during an advance or a retirement, there are no means by which the service dress can be sterilized. This can best be done by attaching another Foden lorry disinfector for this special purpose to each division in the field. The disinfectors should be used for nothing else except the sterilization of the men's service dress and blankets as frequently as possible, although blankets are not particularly guilty of causing pediculosis.

This complaint is not a very serious cause of wastage in a good division, in which the men are previously inspected by their medical officers. If inspections are frequent and thoroughly carried out, cases are seen early and sent to a divisional or corps scabies station for treatment, at which place they can be cured in a few days and returned to duty. The treatment for scabies now considered the best is the old one of a daily hot bath with a thorough scrubbing with soft soap followed by inunction with a sulphur ointment. This done every day for three days in mild cases results in cure. If inspections are thoroughly carried out, there should be only mild cases to treat.

Each divisional or corps rest station is equipped with a steam disinfectant on the Servian barrel system, and there is no difficulty about disinfecting the clothing of scabies cases.

Prevention of Wastage in Convalescent Depots. Lt. Colonel C. G. Brown, R. A. M. C.

Colonel Brown said he would approach the subject from the point of view of the commanding officer of a convalescent depot.

What strikes one first is that even during periods of heavy fighting the *proportion of sick to wounded* passing through convalescent depots is very high. In the speaker's own depot, during the period January 1st to July 16th, 1918, there were 21557 admissions. Of these 7004 were due to wounds and 14553 were due to sickness. At the present time the ratio is 5 to 1, and the average over a period of 12 months would be about 3 to 1. Amongst the admissions due to sickness, 3354 are due to P. U. O., 2041 to I. C. T., 1467 to influenza, 583 to trench fever, 222 to boils, 165 to scabies and 76 to impetigo — a total of 7908. The speaker has selected these diseases as having for their origin our persistent enemy the louse or want of personal hygiene. In view of recent work and allowing for errors of diagnosis, he thinks it may be suggested that the vast majority of the P. U. O. and influenzas are in reality trench fevers and due to the *louse virus*. He is prepared for any pathologist present to dispute this. The figure for admissions due to these diseases is half that for the total admissions for sickness and actually exceeds that for the total admissions for wounds. The speaker declared, therefore, that the principal cause of our sick wastage from the front areas is the louse. To attack and if possible abolish the louse would result in no more overcrowding and congestion of medical units and transportation.

A second source of loss of man-power from the armies is found among the class of men whom the speaker likened to the traveling *circus*. There is undoubtedly a large proportion of men who spend their whole lives in circulating between hospitals and convalescent depots on the L. of C. This type of man knows all the best cards to play and how to play them. He is an adept at obtaining employment and so prolonging his stay in a convalescent depot.

The speaker gave in detail the amusing histories of two cases of clever evasion and "camouflage" whereby the offenders succeeded in putting in their time anywhere but with their units.

Another cause of wastage is the *enlistment* and reenlistment of *unsuitable men*. The speaker read the following significant letter from a neurasthenic:

" Sir.

" This is some of my history since 1915. In 1915 I enlisted in the O. T. C. They only kept me about three days and rejected me. I then went on war work but again in 1916 I enlisted in the R. F. A. They kept me two days and rejected me as unfit for service with the Army. Again in 1916 I joined the R. G. A. I was only 37 days and was discharged as not being likely to become an efficient soldier on medical grounds. In 1917 I was under four medical boards. I was rejected each time and passed C. 3. In February 1918 I volunteered to come out in the M. T. I came out about three months ago and after being five days up the line I was sent to Hospital with Fits, Neurasthenia, and D. A. H. In June I was sent to my Base from No. 13 Convalescent Depot, was there about a week, and was sent back to Hospital again. I have some kind of attacks which take me suddenly. For years after them I lose my speech and also lose the use of my right side for some time. I cannot do much walking or lifting for I get pains in the right leg and across the back. I am also very short-winded. "

The speaker wondered what the cost of that man had been to the state.

The speaker next considered what effect the convalescent depot may have on man-power and wastage. The treatment and methods adopted at convalescent depots, he said, vary enormously and it is an undoubted fact that if all depots were run on perfect lines the morale and mentality of the whole army would be affected.

It is absolutely essential that the right and only the right atmosphere should pervade the whole depot. *Sport and games* must be regarded as the most important part of the training. Under games should be included a system of physical training. *Boxing* above all must be encouraged to the greatest possible extent. This is the finest training for war these lads can have. Running contests have been especially effective as a means of keeping up the regimental spirit. Once men are made to participate in games and sports they soon begin to forget the sordid life of the trenches with all horrors and terrors which go to make up modern warfare. Besides games and sports there should be provided amusements of every kind, concerts, cinemas, bands, etc., as good food as possible and a varied diet scale; and there should be just enough discipline to remind the men that they are soldiers and that they have finished their Hospital treatment. The word " patient " should never be used in connection with a man in a convalescent depot. The more military the organization, the more quickly will results be achieved.

A convalescent depot is virtually a *training brigade* and should be organized into battalions, companies and platoons. The inter-company spirit and rivalry in games should be developed to the highest pitch by means of inter-company contests. To realize the benefits of a convalescent depot, one should see a convoy arrive, slouching, untidy, unsoldierly and disappointed men. Then one should see an evacuation party, smart, clean, well set up soldierly men going away in good spirits and with smiling faces though knowing full well what they are going back to — whistling shells!

The speaker believed that above all there should be an adequate staff of *permanent* workers at the depot. If convalescents were called on for too much of the routine work it greatly reduced the good effects of the rest. The speaker understood that the American arrangements had been planned on a smaller scale than the English, and he feared that this was a mistake.

The types of cases included under these Mild *P. U. O.'s* and very slight Wounds ought never to be sent to the convalescent depot. They could be dealt with better at a corps or army rest station.

Problems of a Regimental Officer. Major Cowie, R. A. M. C.

The speaker said he had spent most of his life as a regimental officer, and, as such, he had come to realize that this war is a bloody business. He wanted Americans to know this. It had been a great pleasure to him to observe the cordial relations between the British and Americans in general, and he was much pleased with the hearty reception given to the British representatives at the Conference.

With regard to wastage, he believed there would be less wastage if there were more prevention; if, secondly, the doubtful cases could be kept with the regiment and the others brought back quickly to their unit; and if, thirdly, the permanency of the regimental medical officer could be assured.

In the matter of sanitation, the speaker believed the most important thing to be the education of the army officers, so that they might feel it to be the duty of each individual officer, and not merely that of the regimental doctor to maintain the health of the regiment.

There are engineering schools, artillery schools, and why should there not also be sanitation schools where army officers might be taught sanitation? These should be conducted by staff officers and not by medical officers.

The speaker said that he hoped he might live to see the time when there would be lively competition to enter the regimental medical service. The regimental M.O., as a young man, has at pres-

ent nothing to look forward to. People were often heard to say that the regimental M. O. was a nuisance, and that if he " had any guts " he would have left the regimental office long ago. Major Cowie believed that these officers should be given the same chances of promotion as other medical corps men.

It was highly desirable to keep men with slight diseases in touch with their regiment, and proper provision should be made to accommodate all such without the necessity of sending them down to the hospital. In this way almost all light affections, like skin, throat, and digestive disturbances, might be made less wasteful to the army.

For this purpose every regiment should be equipped with two Bell tents for isolating cases. A stove should also be provided in every regiment to aid in the treatment of cases requiring warmth. The Primus stove is excellent for the purpose.

The Most Frequently Observed Oto-Laryngeal Affections and Wounds, and the Means of Treatment to Avoid Wastage. By Médecin-Major A. HAUTANT.

The speaker said in part :

Chronic suppuration of the middle ear, complicates more than half of the cases. The majority of these date from before the war, and others are due to acute traumatic otitis. It would have been possible by treatment with glycerine, alcohol, and tincture of iodine in equal parts to avoid a great number of thecases of chronic otorrhea which have come under our observation.

1. Apart from the cases of suspected tuberculosis of the ear, and serious lesion, all other causes of chronic otorrhea are compatible with active service. If a case of otorrhea is healthy and robust, why eliminate him from fighting units?

2. During the war, the treatment of otorrhea must be palliative and conservative. One must be very chary of surgical intervention, and take into consideration the septic condition of the operative area, and also the lack of good will on the part of the patient.

Thus, after two years the speaker decided that conservative treatment was the best for cases of otorrhea, destruction of the ear-drum, distribution of the granulation, and ablation of polypi.

As a sort of corollary to this medical routine, there is a corresponding military routine. The regimental doctor must be informed as to the nature of the man's affection and the treatment that the patient himself is capable of bringing to bear.

Deafness through Nervous Commotion

This may be caused simply by shell-burst without any physical

lesion. During the first two years of the war, these cases were very frequent. The last two years they have been less so. This diminution may have been due to the fact that the men later became accustomed to loud explosions. Instead of leaving these patients in the ordinary hospitals, they are gathered together and treated immediately.

1. *War deafness* caused by simple commotion is a reality, but in general it is but transitory.

2. In certain cases, however war deafness remains.

The question arises as to whether the patient is a malingerer, or whether he is subjet to true nervous deafness. Apart from the instances of simulation, in the majority of cases of war deafness the patients are genuine, and their auditory disturbances may arise from two sources:

1. Labyrinthine.

2. Endocranian.

That the latter is frequent is revealed by the resut of lumbarl puncture.

On the whole, war deafness seems to be dependent upon fairly superficial anatomical alterations, and, if it becomes marked, it is because of the introduction of the psychic element. Definite war deafness can be avoided by combating that psychic element.

There are two means of doing this.

1. Initial treatment.

2. Auditory re-education.

It might be possible to forestall war deafness because it is nearly always superadded to an auricular condition which is often transitory. Or it may even be supperadded to a former auricular condition. It might not be a bad plan to place all men with these old auricular lesions in the secondary services, thereby not exposing them to violent bombardments

Aphonia.

Etiology. There are two main causes.

a) The after-consequences of ordinary acute laryngitis.

b) Gas intoxication.

II. *Lesion.*

These are diverse in character.

a) In the first group are the causes of simple muscular weakness — in other words, cases of asthenic laryngitis.

b) In the second group are lesions of chronic hypertrophic laryngitis.

These lesions are often diffuse, although they are also often confined to the inter-arytenoidal space.

Frequently tuberculous laryngitis consequent upon a phase of non-ulcerated infiltration is suspected — an error which cannot be too strongly emphasized.

III. *Treatment.*

a) Prophylactic, which consists of the cleaning out and the disinfection of the nasal passages.

b) Curative, which consists of respiratory and vocal re-education.

In short : —

Apart from serious surgical affections of the ear, nose, and throat, practically every case of oto-laryngitis may return to his fighting unit.

The frequency of these infections may be greatly diminished by keeping the nasal passage and the naso-pharyngeal cavity in good condition.

In confirmed cases simple palliative methods may be used, but very seldom surgical intervention. Even if these cases prove obstinate, the medical officer must not lose patience. He will often bring about sufficient improvement to admit of the man's return to the front.

The Wastage from Disease in the American Expeditionary Forces in the Year June 1917 to May 1918. By Major Haven Emerson, M. R. C.

The following is a detailed summary of Major Emerson's Report:

If there had been no loss of service on account of sickness in the A. E. F. in the year ending May 31st, 1918, 62,714,000 days of service would have been given. As a matter of fact, 1,481,000 days of service were lost to the A. E. F., as a result of sickness, that is, 2.377 % of total possible days of service. There have been, of course, losses from battle casualties and from accidents and injuries suffered in the course of industries and transportation carried out by members of the A. E. F. These losses are not included in this report. Of the total days lost on account of sickness, 1,403,130 were lost in hospital and 77,870 in quarters. The days lost were due to 137,075 cases of sickness resulting in 923 deaths (.07 %); 110,687 returned to duty (84.36 %); otherwise disposed of by discharge, return to the United States, or in other ways (15.55 %).

The following list of diseases or disease groups represents 77.11 % of the total days lost from sickness, that is 1,142,288 days. The order in which the diseases appear in the list is the order of their

importance measured by the numbers of days of sick wastage caused by these diseases in the past year.

1. Mumps.
2. Bronchitis.
3. Venereal Disease.
4. Laryngitis, Pharyngitis, Tonsilitis.
5. Pneumonia-Lobar.
6. Measles.
7. Tuberculosis (all kinds).
8. Arthritis, Synovitis (acute and chronic).
9. Rheumatic Fever (acute).
10. Otitis Media.
11. Hernia.
12. Enteritis, Colitis, Gastritis.
13. Broncho-Pneumonia.
14. Appendicitis (purulant and catarrhal).
15. Scarlatina.
16. Not yet diagnosed.
17. Pleurisy acute fibrinous.
18. Skin Diseases (other).
19. Hemorrhoids.
20. Flat Foot.
21. Valvular Disease of the heart.
22. Diphtheria and Carriers.
23. Heart Disease (other).
24. Mental Disease.
25. Scabies.
26. Furunculosis and Pyodermias.
27. Meningitis and Carriers.
28. Abscess of Skin.
29. Sinusitis.
30. Abscess, peritonsillar.
31. Phimosis.
32. Lymphadenitis.
33. Conjunctivitis.
34. Trench Foot and Chilblain.
35. Mastoiditis.
36. Fever of Unknown Origin (Trench Fever).
37. Orchitis.
38. Hypertrophied Tonsils.
39. German Measles.
40. Nephritis Acute and Chronic.
41. Dysentery.
42. Stomatitis and Gingivitis.

Of the total number of days lost from sickness, 488,033 days or 32.41 % were lost from the following preventable diseases :

Diphtheria and Carriers.
Dysentery.
German Measles.
Measles.
Meningitis and Carriers.
Mumps.
Fever of Unknown Origin (Trench Fever).
Venereal diseases (Chancroid, Gonorrhea and Syphilis).

Another 284,458 days or 19.20 % were lost from other diseases resulting from preventable and unfavorable conditions of personal environment, such conditions as are not always controllable in Military operations; namely, overcrowding in quarters, exposure to cold and wet and fatigue. The " maturity " or " seasoning " of troops will diminish these diseases, but that is generally another way of expressing the steady improvement in the personal hygiene of troops as the line officers are educated in the necessity of ceaseless and painstaking vigilance and forethought. The diseases referred to are :

Pneumonia Lobar.[1]
" broncho.
Bronchitis acute.
Pleurisy acute.
Acute Rhinitis.
" Pharyngitis.
" Laryngitis.
" Tonsilitis.

Secondary in many instances to one or more of the above group of affections of the respiratory tract are :

Sinusitis.	Mastoiditis.
Otitis Media.	

which add a total of 36,390 days lost or 2.45 % of total days lost.

During the year ending May 31st, 1918, there have been 34,892 cases of the following communicable and preventable diseases in the A. E. F., 1,214 among Officers and 32,668 among enlisted men.

Pneumonia.	Mumps.
Meningitis.	Diphtheria.
Measles.	Influenza.

This is 34.30 % of all cases other than those due to injury and in action.

These six communicable diseases need no intermediate host or other means of transmission than the direct conveyance from the sick or from early and undeclared cases to the well, of the discharges from the nose and mouth, that is, the moist spray and the spit.

In the case of diphtheria, mumps, and measles, a practical immunity is conferred by an attack of the disease, but this is not the case with the other four diseases mentioned, and it is furthermore recognized that an attack of influenza or pneumonia renders the subject more and not less susceptible to subsequent attacks.

We may expect a decidedly lower incidence of measles and mumps next year in the organizations which experienced epidemics of these diseases in the United States or France during the past year; but the recruiting and arrival in France of much larger numbers of men, transported under at least as unfavourable conditions of crowding on shipboard as were those a year ago, will doubtless reestablish widespread epidemics of these diseases unless radical improvements are made in the matter of barrack crowding, and in facilities for holding of exposed or contact cases for observation apart from the rest of a command.

There is no reason to expect any material reduction of the other diseases, i. e., diphtheria, influenza, meningitis, pneumonia, simply as a result of a longer experience by our troops of the climatic conditions in France, for scarcely 10 % of the expected strength for the winter of 1918-19 was in France in the winter of 1917-18.

It is to be noted particularly that although the officers represent about 6 % of the total strength, they represent only 3.4 % of the cases of the diseases under consideration and only 12 % of the

pneumonia, a disease which may properly be said to occur in direct proportion to the degree of overcrowding in living quarters.

By correspondence with the D. D. M. S. Sanitation of the B. E. F. the incidence and death rate for pneumonia in the B. E. F. has been obtained and is here compared with corresponding rates in the A. E. F. for the months of January, February and March 1918, the months of [the annual high pneumonia incidence in temperate climates.

American Expeditionary Forces.

	No. of cases of Pneumonia per 100,000 per month.	No. of deaths from Pneumonia per 100,000 per month.	No. of deaths from Pneumonia per 100 cases of Pneumonia.
Jan.	258.73	85.71	33.13
Feb.	96.89	32.89	33.95
March.	175.81	48.74	27.72

British Expeditionary Force.

Jan.	17.11	2.43	14.19
Feb.	5.65	.31	5.66
March	10.11	.47	4.69

An additional evidence of the seriousness of the situation with regard to pneumonia in the A. E. F. is to be seen in a comparison with case and death rates in the United States Army in the period 1905-14 and for the years 1915 and 1916, and with the death rates among males of the ages between 20 and 45 in the United States registration area and in the insured whites of the largest insurance company in the United States.

U. S. Army Enlisted Troops (Monthly Average).

1905-14.	21.3	2.67	12.7
15.	24.8	3.08	12.6
16.	21.3	3.00	14.2

Civil Population in United States (Monthly Average).

	No. of cases of Pneumonia per 100,000 per month.	No. of deaths from Pneumonia per 100,000 per month.	No. of deaths from Pneumonia per 100 cases of Pneumonia.
Registration Area Males.			
Age 20-24.	—	3.03	-
25-34.	—	4.24	—
35-44.	—	7.70	—
Met. Life Ins. Co. Insured White Males.			
Age 20-24.	—	2.65	-
25-34.		5.78	—
35-44.	—	12.08	—

The contributing causes of the high diseases incidence above detailed are insufficient warm clothing and blankets, lack of facilities for drying of clothing, in some instances fatigue from long drilling or labor, and insufficient floor space per capita to permit of sanitary sleeping conditions.

The pre-War standard in the U. S. Army for barrack floor and air space was 60 sq. ft. and approximately 600 cu. ft. per capita. Owing to the restrictions put upon materials and transportation, the British have established a minimum standard of 40 sq. ft. of floor space per capita and approximately 400 cu. ft. air space per capita. The regulations governing floor space and cubic air space allowed to French soldiers in barracks provide for a minimum of 32.8 sq. ft. and 529 cu. ft. respectively so far as possible. The limitations placed upon accommodation in the A. E. F. allow but 20 sq. ft. of floor space and 200 cu. ft. of air space per capita.

There are a few other special groups of diseases which are worthy of note :

Colitis Entero-Colitis Diarrhea Gastritis Constipation	42,012 days lost

These may be properly attributed to limited, unsuitable food and drink, or errors in its preservation, transportation, preparation, or serving.

A loss of 10,700 days from Hypertrophied tonsils and peritonsillar abscesses could have been prevented by suitable operative removal in childhood.

Proper training in posture and walking, and well fitting shoes would have prevented most of the loss of 10,747 from flat foot.

If company discipline, adequate supply of dry clean socks, and shoes and daily attention to the toilet of the feet in winter had prevailed there would not have been the loss of 5,277 days from trench foot and chilblains.

Similarly, if so many men had not been obliged to work in wet clothes and sleep in them too, in winter weather with insufficient covering at night, we might have expected less rheumatic fever and acute synovitis and arthritis which together caused a loss of 54,970 days.

More thorough examination and suitable treatment surgically before joining the A. E. F. would have avoided a loss of 24,848 days from hernia.

Complications of venereal disease, or results of them, are found in phimosis and orchitis which added 10,575 to the days lost.

From the three disease groups :

Abscess of the Skin,
Furunculosis & Pyodemias,
Scabies,

there was a total loss of 25,563 days. A loss largely avoidable by the thorough application of well-known and well developed methods of prevention and treatment, as was shown recently by a division in the front line which reduced its Scabies from over 400 to 4 cases in one month with corresponding reduction of skin infections.

A total of 6,780 days lost from lymphadenitis has a fairly direct relationship with the losses from skin infections.

That there were so few losses from diseases of the mouth, stomatitis and gingivitis, speaks well for the dental and oral hygiene; 2,584 days.

Although a total of 28,503 days from tuberculosis of all kinds is properly classed as among preventable communicable diseases of civil life, there is no reason to believe there was any new infection or spread of infection to others among the 750 tuberculosis patients (pulmonary, bone, etc.) who have been under treatment in the A. E. F.

We may be excused for expressing gratification in the small loss from mental diseases which amounts to 9,773 days.

Valvular heart diseases, other diseases of heart nephritis, acute and chronic, which come so high on the list of causes of death in civilian populations, show a relatively low incidence even for the age group with which we are dealing; loss of 23,755 days.

Alcoholism is responsible for only 1,235 days lost.

The most serious warning which these figures give is that the penalty we must pay for overcrowding of barracks and billets and inadequate provision of facilities for personal cleanliness, provision of warm dry clothing, is an unnecessarily high case rate of the diseases known to be transmitted by personal contact through the discharges of the upper respiratory tract. This is our most urgent problem at the moment.

Roughly, the prevention of much of the avoidable disease here reported falls under the following six headings :

1. Such education and restraint as will prevent the transmission of inherited feeble mindedness and insanity through marriage of the unfit, and such care of the growing child as will bring it to maturity in good health.

2. Elimination of the physically and mentally unfit at the time of application or drafting for enlistment.

Neither of these resources is within the range of the functions of the Medical Department of the A. E. F.

3. Protecting susceptible individuals by artificial immunization, smallpox, typhoid, diphtheria, etc., i. e., doing things to the men by authority under Army regulations.

4. Protecting foods and fluids at source, in transit, storage, preparation and serving, e. g., testing preserved foods, and chlorinating water, i. e., doing things for the men by authority.

5. Maintaining discipline, orderliness, cleanliness, and standards of living, e. g., policing camps, providing prophylactic stations, etc.

6. Teaching by example, by written and spoken word, and by all the various appeals through educational methods, the principles and practice of personal hygiene.

TRANSPORTATION OF THE WOUNDED

Transportation of Sick and Wounded. Colonel F. S. Gallie, R. A. M. C.

The transportation of sick and wounded from the front area to the hospital bases in France and from those bases to the United Kingdom presents, the speaker said, very many difficulties. He said he would deal especially with the transportation of patients to the bases, and of some of them eventually to England.

Plying between the casualty clearing stations and the various bases are ambulance trains and ambulance canal barges. The vast majority of patients are, of course, conveyed by ambulance train, and for this purpose there are, at present, no fewer than 41 such trains in commission.

Ambulance Trains.

The growth of the ambulance train services will be readily appreciated when it is noted that although there were only 4 trains in August, 1914, 9 in October, and 12 in December of that year (one of which was of British stock), by the end of 1915 there were 20 trains in circulation, by the end of 1916, 30 trains, and by the end or 1917, 38 trains; whilst at the present time there are, as already stated, 41; of these 4 are reserved for service with the British Forces in Italy.

The earlier ambulance trains were primitive when compared with the later trains which were built in England, and which are so furnished and equipped as to constitute mobile hospitals.

In the earlier trains, which were of necessity composed of French railway (non-communicating rolling stock, patients were largely carried on field stretchers suspended on Brechot frames. On these improvized trains the culinary facilities were not great, the sanitary arrangements were improvized, and it was only by the exercise of marked initiative on the part of the train commanders that the success which crowned the work of these earlier units was won.

In March, 1915, the 11 French trains then in our service were re-constituted, and their carrying capacity greatly increased: internal alterations of the coaches added to the comfort of the patients carried, and many other facilities were provided, which increased the efficiency of the train service generally.

Each train added to the service since December, 1914, is composed of British rolling stock, and the present day ambulance train leaves little to be desired as regards facilities for the treatment of patients *en route* from the forward areas to the bases, or during the long journeys from Italy and from Marseilles to the English Channel ports.

An ambulance train generally comprises: 9 coaches for wounded (each coach containing from 36 to 42 bed cots); 1 coach fitted as dispensary and operation room; 1 as isolation ward; 2 as kitchen coaches; 1 as stores coach; with 1 coach for the medical officers and nursing sisters and 1 for the personnel: that is, each train has 16 coaches, all intercommunicating, and is of a total length of about 320 yards. Each train accommodates some 500 patients, dependent on the numbers "lying" and "sitting", but in periods of marked activity up to 600 patients are frequently carried.

The United States military authorities have had a large number of ambulance trains constructed in England, and these are now in commission in this country. The model of the British train was accepted as suitable, and the U. S. trains as they run, are practically identical with the British trains. The speaker thought it very advantageous that this should be the case, as it makes the respective service of ambulance trains homogeneous. The trains can be interchanged, and already the respective medical services have helped one another by such interchange during periods of activity in particular areas.

The importance of making trains as comfortable as possible for the carriage of the grievously wounded cannot be exaggerated. The ambulance train is the first medical unit in which the wounded patients feel that they are really resting. They have left the noise of the guns, the turmoil and tumult of the battle area, and have started on the road to recovery, and it is of the utmost importance that every effort be strained to provide all the comforts, and even

luxuries, possible, for the benefit of those who have fought heroically, and to whom fate has allotted the pain and discomfort of battle wounds.

In periods of expected activity in any area, empty ambulance trains are held in reserve in near garage stations. When the numbers of patients in the casualty clearing stations demand it, the Director of Medical Services of the army concerned asks that the necessary trains should be moved forward to the " loading point " and this is arranged for by the French railway authorities through the liaison of the British Railway Transport Department.

As the loaded train leaves the railhead for the hospital base, the detail of the convoy and the hour of its departure is notified by telegram to the Administrative Medical Officer of the Base to which it is consigned, and to the Director of Medical Services, Lines of Communication.

Whilst en route to the base, such wounds as require dressing are attended to, splints are re-adjusted, medicines are given as required, and all patients are liberally fed and given comforts; in short, the patients whilst on the trains are treated, as far as facilities permit, exactly as in a base hospital.

On arrival of the trains at the base, stretcher-bearers are found waiting on the platform to detrain the patients, and motor ambulance cars in attendance for the conveyance of the patients to the various institutions at the hospital center.

The distribution of patients from the front areas is a matter of the greatest importance. The Headquarters office of the D. M. S., L. of C., decides the destination of each train in accordance with the numbers of vacant beds existing at the various hospital centers, always keeping in view the desirability of shortest possible journeys for severe cases. These destinations are given by him to the Director of British Railway Transport who, in turn, arranges with the French authorities that each train proceeds to the base allotted.

The telegraphic notification of the departure of the train from the railhead station enables the Administrative Medical Officer at the base to which the train is consigned to make the necessary arrangements for the reception of the patients on arrival, and to arrange that the necessary bearers and ambulance vehicles are actually awaiting the train as it arrives at the station.

Picture then these 41 trains -- each capable of accommodating 600 patients — forming in truth a huge mobile hospital of 25,000 beds. An Army engaged in battle activity demands a section of this mobile hospital to be sent at once to the forward area to provide urgently required hospital accommodation for

casualties. In accordance with that demand two, three, or even ten trains (each train in itself a complete hospital section) steams off to the scene, and takes over the patients.

It may happen that there is activity in two armies, or in four armies, but the trains are ample, and off steam the mobile hospital sections — complete not alone in medical equiment, but in medical personnel, supplies, stores, etc., — to relieve the congestion of the forward area hospitals by transferring the suffering, and that with all possible practical comfort, to the commodious and thoroughly equipped hospitals at the various bases.

Such a picture will give an idea of the ambulance train organization, an organization which employs some 100 medical officers, 150 nursing sisters, and over 2,000 rank and file.

Stores and Garages.

At certain of our large bases we have garage stations for such ambulance trains as are being held in reserve and at these stations are established train supply stores at which establishments all ambulance trains are replenished with necessary food, comforts, linen, ordnance equipment, etc.

Small workshops are attached to the stores, and facilities are afforded for minor repairs, etc., as are required by the trains.

Barge Transport.

As many waterways exist, particularly in Northern France, the transport of wounded men from certain of the forward areas to the bases by ambulance barges is possible, and our service of ambulance barges has been in existence since 1915.

The barges travel in pairs towed by a steam tug. Each barge is fitted as a hospital ward of 30 beds, and is specially equipped for the carrying out of necessary treatment. Such transport is particularly suitable for G. S. wounds of chest, head and abdomen, and indeed for very severe cases generally, but it has the definite disadvantages of being slow, being very limited in its capacity, and in its possibilities of application.

Our barges are very well fitted, they are all lighted with electricity and are kept in commission throughout the year.

They work under practically the same routine as do the trains and are of course under the same direction.

If any officers of the United States Army are specially interested in the detail of any particular branch of ambulance transport, he will gladly be afforded opportunities of seeing the system in being.

The speaker wished strongly to impress upon his hearers the

necessity for realizing that the patients in the front area medical units require to be transported to the base by Ambulance trains, that it is essential to be practical in preparations especially with splints; although extreme abduction of fractured limbs may be desirable, the patient will have to be transported. The speaker had seen patients sent for transport, who, owing to the nature of the splints applied, could not be got through the double doors of the railway carriages.

Patients suffering from Compound Fractures of the lower extremities, and those suffering from severe chest and abdominal injuries should not be moved from the stretchers on which they are placed in the front area hospital, and a distinctive instruction to this effect should be given when transport begins; the bed cots on the trains being so constructed that stretchers can be laid on them and patients left undisturbed.

Patients should be carefully classified, and patients who are " in extremis " should not be sent to the trains.

As a general rule severe cases should be those first sent for entraining; this permits the train commander to assign to them the best cots. See that helpless patients are catheterized before being entrained — the train is a busy unit during the earlier stages of the journey.

Ambulance Ships.

From certain of the seaports in Northern France, ambulance transport ships sail to England. Such patients as are not considered likely to be fit for duty with the army, or for discharge from hospitals to the convalescent depots in this country within four to six weeks are embarked on these ships and by them transported to England, where, on arrival, they are distributed to various military hospitals for further treatment.

Some of our hospital centers are, as you know, established in the immediate vicinity of the seaports, and the selected patients from such centers are transferred direct to the ambulance ships by motor ambulances.

From the earliest day of the war the service has been continuous, and though some of our ships have fallen victims to enemy action the service has never for a moment halted.

" Carry On " has been the motto — and our sick and wounded soldiers fully appreciate the splendid spirit which has prompted their sailor brothers to continue the service of Cross-Channel transport, despite the inhuman attempts of the enemy to destroy, if possible, the vessels conveying the invalids to their homeland.

Methods Employed During the War for the Evacuation of Wounded from Forward Areas. Colonel H. Exsor.

The methods of transportation of wounded, the speaker said, have undergone considerable improvement since the outbreak of war.

At that period the methods were the following : — The horsed ambulance wagons attached to each field ambulance conveyed the wounded from as near to the firing line as possible to the divisional dressing stations. From the latter point they were removed to the casualty clearing stations or clearing hospitals by means of the G. S. wagons of the supply sections of the divisional train and the motor lorries of the divisional supply column.

Supplies reached a division in the field in the following manner : —

A place on a railway line was chosen as the railhead of the division, where a casualty clearing station, or part of one, was opened. The supplies arrived by train and were loaded into the motor lorries of the divisional supply column and taken to a place known as the refilling point. At this point the G. S. wagons of the supply sections of the divisional train met the motor lorries of the supplies column and the rations, etc., were transferred to the G. S. wagons which delivered them to the troops in the field.

This routine was carried out every twenty-four hours, the important fact being that once during these twenty-four hours the G. S. wagons returning empty from the divisional area to the refilling point, and the motor lorries of the supply column returning empty from the divisional train to the railhead, were available for the transportation of sick and wounded from the divisional area to the refilling point, and from there to the railhead casualty clearing station where they received attention until evacuation to the base hospitals by means of ambulance trains was possible.

The railhead and the refilling point varied in accordance with the movements of the division, and with the railhead, the casualty clearing station, and the supply column headquarters. The refilling point must never be more than 45 miles from the railhead and, as a rule, it was very seldom more than 15.

The speaker next considered how the A. D. M. S. of the division succeeded in getting the wounded away from the railhead.

He took care that the main dressing station was situated on a road which the G. S. wagons of the supply section of the train would use on their way to the refilling point.

The A. A. and the Q. M. G. gave orders to the O. C. train that his G. S. wagons were to halt at the dressing station for the purpose of

taking up the sick and wounded and carrying them to the refilling point.

The O. C. supply column would also receive similar orders to transport the patients to the casualty clearing station at the railhead.

These early arrangements seem crude and imperfect to us now, but they worked well so far as the actual evacuation of the sick and wounded was concerned.

The advantage of this system of evacuation was its economy of transport. Its disadvantages were many and obvious. The most important were: (1) The unsuitability of the G. S. wagons and 3-ton lorries, no matter how carefully prepared with straw and hay, for the carriage of severely wounded and dangerously ill men. (2) The dressing stations could only be cleared once in twenty-four hours instead of continuously as at present. (3) The medical services were dependent upon transport of which they had not sole control, and of which the primary duty was the feeding of troops. (4) The evacuation of wounded from the dressing stations to the refilling point was very slow and often took hours.

Steps were taken to render the medical services independent of the supply services by providing motor ambulance cars. The division the speaker was with was provided with two such cars. In a time of stress they succeeded in clearing quite two-thirds of the lying-down cases.

By the end of October 1914, or early in November, every army corps had been provided with a motor ambulance convoy, and these cleared individual dressing stations into the casualty clearing stations daily or as often as was necessary. This rendered it unnecessary for the clearing stations to be attached to the railheads, and they were opened out at other convenient places where good accommodation was available.

Early in 1915, seven motor Ambulance cars were allotted to each field ambulance of a division, and the seven horsed ambulance wagons were withdrawn. This is the present establishment of each divisional field ambulance in the B. E. F.

In the pursuit of a defeated enemy, horse rather than motor transport will prove advantageous in that it can more easily surmount the obstructions which the enemy is sure intentionally to leave in his wake.

At the present time, the evacuation of the wounded is carried out as follows: —

The A. D. M. S. of an attacking division reserves all available motor transport (15 large ambulance cars and 6 Fords) for the lying-down and sitting cases. The Fords are on duty in front of the

advanced dressing station, so as to relieve the field ambulance bearers, whereas the large cars will do the work from the advanced dressing station to the main dressing station.

The large cars will then act as a divisional convoy. The time of assembly of the cars will have to be some hour after dark on the day before the attack, or else before daybreak on the day of the attack, in order to avoid being seen by the enemy's aircraft.

When all is ready for the attack, there ought to be one car on duty at each advanced dressing station. At a given point on each road leading from each advanced dressing station there should be a cab-rank of three cars. The remaining cars will be in readiness at the headquarters of the divisional motor ambulance convoy. As soon as the first is seen to leave the advanced dressing station, one of the cab-rank moves forward to replace it, and is in turn replaced by one of the cars from headquarters. The driver as he comes in must not fail to state from which station he has come. This forms a constant stream of cars, and also gives the drivers a certain amount of time, while waiting to replace the car in front, for rest and food.

The duty of clearing the main dressing stations devolves upon the A. D. M. S. of the Army Corps to which the division belongs.

The result of the economy of time permitted by this new scheme is that within two or three hours after being wounded, the patients arrive at the casualty clearing station in a good condition to stand operation.

The slight walking cases, after being dressed at the regimental aid posts, are directed to a collecting station for walking wounded, from whence they are conveyed by motor lorry to a casualty clearing station.

Arrangements are usually made for any lorries which may happen to be proceeding in the required direction to be made available for slight cases. A small but important point in such arrangements is the provision of a ladder to assist the patients to mount.

The Transportation of Wounded Men from the Point of View of Motor Ambulance Convoys. Colonel G. Poe., R. A. M. C.

Motor ambulance convoy, the speaker said, is classed as "Army troops", allotted usually at the rate of one Motor ambulance convoy to a corps. A Convoy is composed as follows :

Officers R. A. M. C.	1
" A. S. C. (Road Officer)	1
" " (Workshop)	1

Other Ranks R. A. M. C.	18
" " A. S. C. (Drivers et Workshop)	104
Motor Ambulances	50
Touring Cars	2
Motor Cycles	7
Motor Lorries (Workshop)	1
" " (Supply)	1
" " (Stores)	2

The commanding officer has no professional work to do as none is practicable.

The usual function of a motor ambulance convoy is to clear sick and wounded from the main dressing station to the casualty clearing station. The commanding officer may, occasionally, be ordered to lend cars to a division to clear casualties from the advanced dressing station to the main dressing station if the divisional cars are insufficient.

Pooling of all divisional cars and motor ambulance convoy cars has been tried but the experiment was not always a success.

Cars should be heated by the extension of the exhaust; the pipes from which are carried along in front of each seat.

Each car should carry hot-water bottles, 4 stretchers, and 12 blankets.

A trained R. A. M. C. orderly is required in each car carrying serious head injuries, or cases of hemorrhage.

The chief point is to ensure a continuous flow of cars.

Taking a corps in action with two divisions in the line and two main dressing stations at "A" and "B", a suitable place "C" for parking cars should be selected on a common route from "A" and "B" to the casualty clearing station. Five or six cars — *not more* — should be sent to "A" and "B" at the commencement of the action. As a car passes "C", loaded, and on its way to the casualty clearing station, an empty car should forthwith move up to whichever main dressing station the loaded car came from. On return from the casualty clearing station, empty, all cars should go to "C" and take their places on the stand. There will usually be time for the driver to have some food and a rest before again moving up to the main dressing station.

The number of cars required depends (1) on the distance to the casualty clearing station; (2) the state of the roads; (3) the amount of congestion of the traffic on the roads. Cars frequently take five hours to complete the double journey. If the divisional main dressing station can fill a car every twenty minutes, this would mean seventeen cars on the circuit, otherwise an accumulation

of wounded would take places at the main dressing station.

In ordinary "peace warfare", that is, when no definite battle is in progress, the convoy cars take sitting or lying cases indiscriminately to the casualty clearing station.

During a battle the convoy cars only take stretcher cases and bad sitting cases.

Walking wounded are usually helped along by motor lorries and horsed ambulances to a central point, the corps walking wounded collecting post, from whence they are taken by lorry, light railway, or broad gauge railway to a separate casualty clearing station.

At the corps walking wounded post many cases who have struggled along that far, either by lorry or by walking, become unfit to proceed further by lorry. A certain number of motor ambulance cars — probably five or six — should be kept available for carrying such lying down cases to the casualty clearing station from the corps walking wounded post.

Motor ambulance convoys held in reserve by armies, or corps motor ambulance convoys are also sometimes used for evacuating cases from one casualty clearing station to another further back, when no ambulance trains are available.

This is the use made of a motor ambulance convoy in the British Army, chiefly to keep up a circuit of cars from main dressing stations to casualty clearing stations. If working smoothly, no accumulation of waiting cars or waiting patients should occur at a main dressing station.

The circuit of cars between the advanced dressing station and the main dressing station is done by the motor ambulances belonging to the field ambulances of the division; these are grouped together and used as described by Colonel Ensor.

The great point is to avoid a large group of cars at the main dressing station.

At the main dressing station, the ideal to be aimed at, as far as motor ambulances are concerned, is to have a separate road of entry and exit: (1) for divisional cars, and (2) for motor convoy cars. Separate squads of bearers meet the divisional cars, unload them, and carry the wounded into the receiving room; other squads wait in the evacuation room, carry the patients out, and load the motor ambulance convoy cars. At the casualty clearing station, bearers should be ready to unload the motor ambulance convoy cars immediately, and to hand over to it a number of hot water bottles, stretchers, and blankets equivalent to those received with the patients.

Transportation of Wounded. By Lt.-Colonel R. S. C. Thompson, R. A. M. C.

Considering the transportation of wounded by motor ambulance the speaker stated that three important points present themselves :

1. Distance.
2. Speed.
3. Welfare of patients during the journey.

1. *Distance.* Preference has been given to the transportation of severe cases such as abdominal or chest wounds to a medical unit where they can be fully and completely dealt with under the best available conditions. This is safer than to attempt their treatment in proximity to the line.

As a rule these units are situated at a distance of anything from eight to fifteen miles from the front line, and the speaker thinks that there is no doubt that the longer journey is compensated for by the installation of the patient in a complete medical unit out of range and sound of the battle field rather than in the atmosphere of uncertainty and anxiety prevailing in an operating center within two or three miles of the line.

2. *Speed of Vehicles.* This must be determined to a great extent by the discretion of the drivers founded upon a knowledge of the peculiarities of their own particular cars. In any case, however, it cannot be too strongly impressed upon all concerned that the transport of badly wounded men is a matter calling for the utmost care and skill.

Jolting over a road which is full of holes must necessarily cause acute pain to patients with fractures while it may also provoke or re-awaken fatal hemorrhage. In chest wounds, for instance, Duval in his book says : — " Patients die or have fatal hemorrhage, not only during transport, but because of the transport ". In this connection, the roads along which the ambulances are destined to pass should be examined beforehand, and drivers should also be prepared and trained to drive without lights in case this should be necessary.

3. *Welfare of Patient During the Transport.* The aggravation of surgical shock should be reduced as much as possible as this is a very important point. To this end the A. D. S.'s and the C. C. S.'s must act in close co-operation so that the two units work together as though they were part of the same organism controlled by one brain.

It is exceedingly important that the patient should be made warm for the journey with blankets and hot-water bottles. It is equally

so that he should be given primary treatment for shock, and except in times of stress should not be transferred until considered to be in a fit condition to stand the journey.

Hemorrhage should be checked. If a tourniquet has been considered necessary, this fact must be so clearly marked that the receiving unit cannot fail to know of it as soon as the patient arrives.

Fractures must be immobilized before the patient is placed on the car.

The bladder should be emptied before the journey begins, and the administration of morphia governed by circumstances.

An orderly should travel inside each car conveying dangerously wounded patients.

Severed limbs should be completely amputated before starting.

Bitter experience has taught that the most careful organization is necessary to ensure that the patient's small belongings are transported with him, and for this purpose no advance unit can afford to run short of Lady Smith Dorrien's treasure bags.

When the question of refreshment during the journey is considered, tea receives 99 o/o preference above coffee, cocoa, or soup.

With regard to " stored blood " for indirect transfusion, in many places it has been found difficult to store it in a cold enough place, and it seems that a properly prepared 6 o/o gum acacia solution in normal saline is the next best material for intravenous infusion.

A central laboratory for the turning out of the gum acacia solution in well-stoppered sterilized bottles is essential, in view of the unreliability of the water supply.

Some wounds to be specially considered from the transport point of view are :

1. *Wounds of the Eye.* In the case of a f. b. the patient must be conveyed as quickly as possible to the unit where ophthalmic surgeons are available. In case, however, of complications of a different and more dangerous nature, it should be possible to retain the patient in the C. C. S. and to have him visited there by a mobile ophthalmic surgeon available by telephone, equipped with a magnet and cable adjustable to the C. C. S. electric plant.

2. *Fractures.* — The speaker believed in a minimum variety of splints, and in the advanced units and the C. C. S.'s being word-perfect in their use.

For wounds with involvement of joints, use a Thomas splint. If the buttock or region of the great trochanter is involved, the interrupted Liston should be used. The iron skewer through the boot is the quickest adjunct to the Thomas splint, less gangrene of the foot following its use. Remember to place a second suspension

bar over the patient's hip, so that he can use it during the trip to lessen the vibration of the car. Sinclair has recently made one which can be adjusted on the inside of the wooden side members of a stretcher for the suspension of the foot and of the Thomas splint.

For a fracture of the upper extremity the author considers that a Thomas swivel arm splint is the best. Failing Thomas' leg splint, the attachment of feet to stretcher and perineal sling. *Loosen all ties* as soon as possible. In the case of an open thorax, the sucking pneumothorax must be closed at the earliest opportunity, and, if not sutured, the pad closing the wound removed as early as possible. Sutures closing the chest are infinitely preferable to the firm application of a pad over the hole in the chest.

Gassed cases should always travel as lying-down cases on a stretcher.

Each C. C. S. should have a road or roads by which reception of patients and evacuation to ambulance train can be carried on at the same time. It is necessary to have in the C. C. S.: (1) A special party of stretcher bearers for each stretcher bearing service. (2) A sufficiently large reception room or annex. (3) A means by which the drivers of the cars can pick up an equivalent number of stretchers, blankets, and so forth, to that which they have brought with the patients. At times the C. C. S. must even supply exhausted and under-equipped A. D. S. stores of blankets, and a considerable reserve must be held.

The ideal is for the C. C. S. to disinfect all blankets arriving from the A. D. S. The disinfection of cars after conveying an infectious case is best carried out directly the case arrives at its destination.

Transportation of Wounded. By Médecin-Major Proust.

It must always be borne in mind, the speaker said, that repeated handling and movement are extremely undesirable for wounded men. The ideal would be immediate and uninterrupted transport to the desired destination once examination and designation has been made.

We will now consider the best division of labor for efficient clearance of wounded in the three main centers of operation which are: the group of stretcher bearers, the group of army corps ambulances, and the evacuation hospital. These are the three main divisions of the sieve through which the wounded pass with a minimum number of examinations and dressings.

I. The Group of Brancardiers (stretcher bearers) usually known s G. B. D. are at the point of embarcation of the sanitary trans-

ports, and distinguish between (*a*) the absolutely untransportable cases and (*b*) the fracture cases.

The absolutely untransportable cases are sent to a neighbouring dressing station reserved exclusively for such cases. Among these should be counted all who are wearing tourniquets.

The fractures should be thoroughly and carefully placed in splints which, once adjusted, enable the patients to stand the journey to the special army hospitals for fractures.

Outside of these two classes there remain the great majority of the wounded who demand, for proper classification, an installation and a personnel which the G. B. D. cannot provide. The only thing to do, in a time of offensive, is to separate the sitting cases, which can go by camions to some point of embarcation by train, and the lying down cases which are taken to the groups of Army ambulances, fifteen to twenty kilometers back of the front where the real classification and clearing is done under the direction of surgeons.

II. Group of Army Corps Ambulances.

The role of this group is to obtain results which would not be possible in an isolated ambulance, and it constitutes an excellent clearing-house for the wounded. It helps in eliminating any slightly wounded cases that should not be allowed to clog at this point. Then the wounded are examined, new dressings given, and a certain number of cases are set aside for operation ; the number thereof corresponds to the daily operative capacity of the ambulance. These cases are relatively untransportable.

A certain number of reception rooms should be provided at the army corps ambulance for such wounded as are greatly fatigued by the trip. Those of them who have been examined and whose dressings have been remade under aseptic conditions and who are now capable of going further, are sent back to the H. O. E. or Hospital of Evacuation. The only exceptions to this are those fracture cases which by mistake may be found in the Army corps ambulance. These are sent immediately to the special Hospital of fracture service of the Army. The speaker insisted upon this point — that the wounded admitted to the Army ambulance, who should receive only a new dressing and an injection of anti-tetanic serum, should under no circumstances be allowed to remain there. Any head surgeon who allows wounded to accumulate there does not understand his duty, which is quickly to forward all cases for which he cannot give the required treatment.

The difficulty here is that the means of transportation from the front are more numerous than the means of transporting them to

the rear, thereby causing an accumulation in the Army Ambulance. For this reason there should be a system of automobile transports with a large reserve of cars which could immediately relieve the congestion where necessary. The wounded who have left the group of army ambulances are then sent on to hospital of evacuation.

III. The role of the H. O. E. is to distinguish between the cases needing immediate operation in one of its affiliated hospitals, and those capable of being sent on by train. During offensives, it becomes necessary to make up trains of cases needing operation, whose condition, however, seems good enough to endure the journey. During quiet periods the affiliated hospitals should operate on all cases, and the H. O. E. should evacuate only those cases which have been operated upon and which have become capable of evacuation. The operated cases and the fractures are evacuated then to specialized center for continued treatment.

To return to the large group of the slightly wounded who were put in camions at the G. B. D. Among them are very slight wounds, which, during the fighting in fixed positions, would be taken care of at some special post for the slightly wounded. The operation of these posts becomes difficult during this war of movement, and it often happens that these wounded have to be evacuated. It would be advisable to have at the point where the railroad leaves the front zone, a large sanitary station for the slightly wounded, which would assist rapid recovery and avoid congestion in the front zone.

The G. B. D. simply eliminates the absolutely untransportable cases which it sends to an advanced ambulance, and the fractures which it puts in splints and sends to the center of fractures. The group of ambulances examines all the wounded. This is the real sorting station, and it sends all cases which do not require immediate operation to its affiliated hospitals. Only in times of offensive does it evacuate those needing operations. The slightly wounded, taken by camion, are, during an offensive, evacuated by train to some base hospital along the railroad line of the hospital train service of the front.

During a period of intense military activity, certain precautionary measures are taken to meet the flood of wounded, so that there shall be no blocking at any point. The first halt comes with the recording of the wounded upon their arrival. This should be met with an increased number of the clerical force, or by a simplification of the required records. There should also be an increased number of places of embarcation for the trains, the stations being very limited in capacity.

The Evacuation of Wounded by Motor Vehicles in the Rear Section of the Advance Zone. Colonel PERCY L. JONES, M. C., N. A.

The following is a detailed outline of the address:

Evacuation of Wounded a Very Important Problem.

The evacuation of wounded is a very important and very serious problem. No system will meet the needs under all conditions, as every evacuation on an unusually large scale must of necessity be a rule unto itself. Conveyances of all sorts should be as nearly as possible standardized, and where the quantity is not sufficient to meet the needs under stress, arrangements may also be made using empty vehicles pertaining to other arms of the service en route for replenishments. Even with this assistance, emergencies have arisen, and are constantly arising, where the quantity of transportation is woefully insufficient. All such details should be foreseen and arranged for from information obtained at Headquarters previous to emergency evacuation.

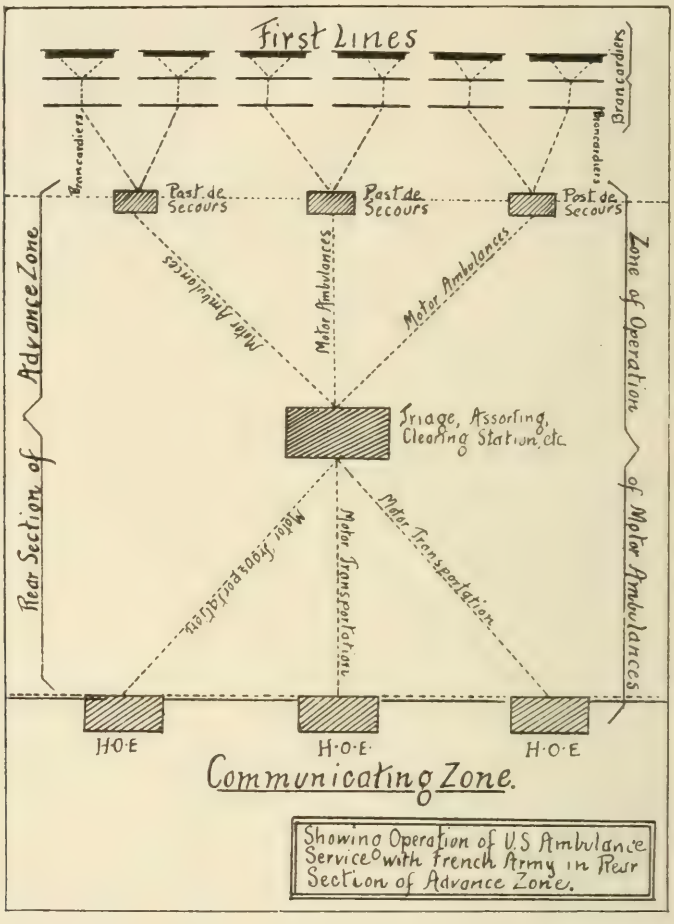
Time Element of Chief Consideration.

There are many factors to be considered in the evacuation of wounded, all of which are very important. They should be considered, however, with a view to shortening the period of non-effectiveness. This resolves itself into a time measure. Where the wounded occur in large numbers, it is frequently impossible for regimental medical personnel to administer the antitetanic serum. Other important factors are comfort, character of vehicles, distances, weather conditions, roads, etc. I think that it is generally conceded that the most important of the above measures is time; consequently, the efficiency of evacuation should be judged by this. This, however, applies more especially to wounds. There is no such thing as a non-transportable case in this zone.

Subject of Evacuation of Wounded Best Treated By Zones.

The subject as a whole may be well considered in zones, and each of these zones differs radically in the method of transportation, and in the care of patients in transit. The first zone is the most advanced section of the advance zone, where the transportation of wounded is accomplished by litter bearers. The second is just in the rear of that section, and comprises the remainder of the advance zone. The transportation of wounded in this zone is accomplished by motor vehicles, preferably the small Ford ambulances. This zone begins at the regimental dressing stations and ends at the H. O. E.'s, and should be considereded *solely* as a trans-

port problem. The next zone is the communicating zone, extending from the H. O. E.'s in the French Service, casualty clearing stations in the British Service and evacuating hospitals in the American Service, to the base hospitals. This zone possesses



ample facilities for transportation other than motor, such as railroad trains, trolly cars, water ways. etc. And, finally, the base zone, which needs no discussion in this paper.

The Evacuation of Wounded in the Rear Section of the Advance Zone. The Sphere of Operations of U. S. Army Ambulance Service with the French Army.

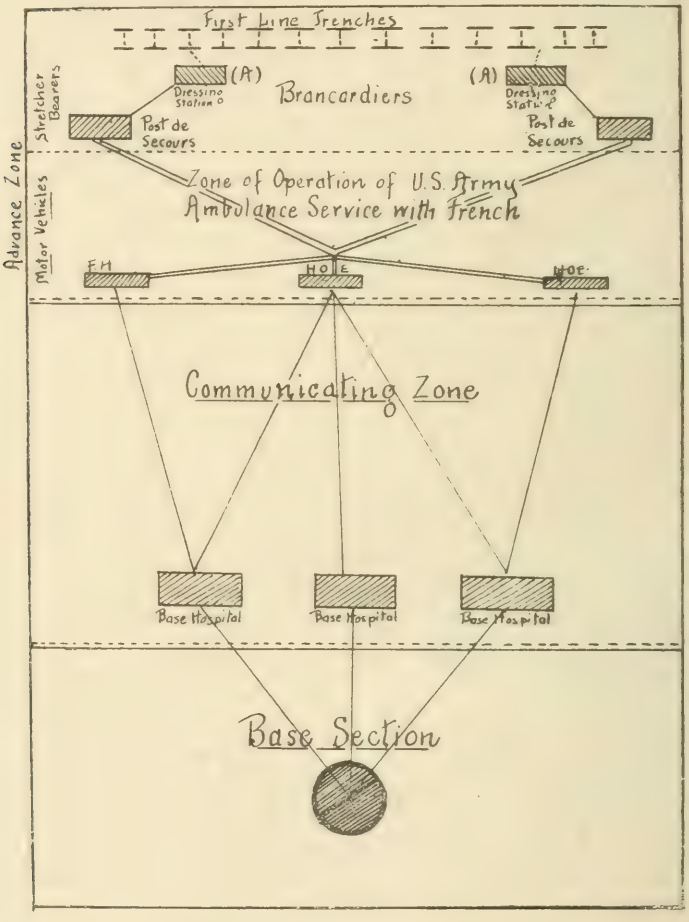
That portion of the advance zone behind the regimental aid stations back to the evacuation hospital, is the one which I am

mostly interested in, and of which I am qualified to speak. In this zone, to my mind, the actual transportation of the patient should be completely divorced from any treatment *en route*. This on the spur of the moment would seem inhumane, but the fact remains that delay may mean comfort for one and infection for one hundred. I believe this is the most important link in the entire chain of evacuation, for it is here that the time factor enters most, and it is here that contact must be maintained with units served. The sanitary section should operate as a part of the division, and should at no time be removed from the division to which it is attached. To administer first aid during transit, proper access to the patient must be had, and in this zone this is not feasible. If the hauls are very long and care and treatment are necessary, they should be administered by qualified attendants at well organized, designated stations. At no time should the chauffeur or orderly be called upon for this duty. Even under unfavorable conditions, journeys of more than two hours on the Western front are exceedingly rare. Is it not better to rush the wounded back to where proper facilities and attendants for their treatment are available than to delay the transit by feeble efforts *en route*? To illustrate, on one occasion recently there were some hundreds wounded in a very small sector waiting evacuation. Every imaginable conveyance was pressed into service night and day. In numbers of instances, there was not even the crudest first aid dressings applied, and it is beyond the range of human possibility for transport personnel to administer first aid. It is occasions of precisely this kind with which we must cope, if we wish these men to return to duty in line of battle. I do not wish to imply that I would never treat cases *en route*, but when they are treated it should be as suggested above. Dressing stations may be well placed along roads of evacuation and manned by properly trained assistants. All dressing stations and rest stations in this zone should be operated by personnel which is not connected with transport units. In this Service the chauffeurs, while hospital men, are not trained for more than elementary individual first aid work. To have a transport section saddled with medical or surgical responsibilities, in addition to the maintenance of their cars, is contrary to efficiency. The principal requisite for concerted and effective results is to have your personnel in hand at all times. This is most difficult, if not impossible, where dismounted men (litter bearers) are to be administered in a mounted command. Along these lines I would like to say that in my opinion I believe it very unwise to have mixed types of vehicles in an ambulance section. Each section, or company, should have one

type of car, some of the principal reasons being to obviate the necessity of having multiple sets of spare parts, multiple sets of repair tools, mechanics versed in more than one type of machine, the necessity of having to depend upon separate parts for supplies and maintenance, etc.

The Ford Ambulance Best Adapted to Advance Zone Work.

Without a doubt the best car for the advance work is the Ford car. It is small, light, easy to run, easy to maintain, simply con-



structed, economical in the consumption of gas, does not take much road space, and can be handled by one man when necessary.

What it lacks in capacity is more than compensated for by the above advantages.

Animal transportation should never be used in front line work, unless it is serving units which use only animal transportation. This on the Western front is very rare.

Differentiating Features of the U. S. Army Ambulance Service.

The American Automobile Sanitary Service closely resembles the British evacuation service in the advance zone. The U. S. Army Ambulance Service uses that of the French. In any system of evacuation in this zone, the fact must not be lost sight of that sufficient elasticity should be provided for in order to keep in constant touch with the units served. When avoidable, ambulances should never travel in convoys, as delays are very much increased thereby in passing troops, etc. Care should be used in selecting roads. Much harm can be done by delaying troops and munitions. Driving a motor ambulance in this service differs from the ordinary convoy work of supply services, where it is only necessary to follow a leader. In addition to a fair knowledge of map reading, the ability to orient onesself, and a knowledge of the conventional map signs, alertness, and individuality are required, which are not essential in ordinary work. These and other numerous essential points should be known by the chauffeur before being allowed to operate in the advance zone. This Service has its own school for that purpose. All replacement troops for this Service arriving from the United States are given an intensive course in the duties of this zone.

ABSTRACTS

SURGERY

The Sterilization of Wounds by Physiological Agency. By Col. Sir A. M. Wright, Capt. A. Fleming, Capt. L. Colebrook. *The Lancet*, June 15, 1918.

A. From a study of the effects of serum deprived of its antitryptic power by addition of trypsin, serum rendered almost neutral by addition of acid, whole blood defibrinated on the growth of streptococcus, staphylococcus, B. coli, B. welchii, under aerobic

and anaerobic conditions in capillary pipettes, the authors conclude :

1. Serum from normal blood and normal lymph constitutes for the vast majority of microbes met with in foul wounds a very unfavorable culture medium. Of the microbes encountered in wounds only the streptococcus, staphylococcus, and cultures of diphtheroid bacilli can grow in unaltered serum ; and when we make a mineral implantation the streptococcus alone gives a growth. In other words the microbes of wounds fall into two categories : — serosaprophytes which grow in corrupted and serophytes in uncorrupted blood fluids. Therefore when a wound contains serosaprophytes there are corrupted discharges. If the wound can be flooded with wholesome serum which is kept uncorrupted, these serosaprophytes will disappear and the streptococci and staphylococci will persist.

2. Trypsinisized serum (present in all wound cavities and tissues when an exudate stands stagnant upon disintegrated leucocytes produces an excellent medium for all bacteria.

3. Neutralized or partially neutralized serum (present in every condition of collapse) is a medium on which the ordinary, as well as the gas gangrene, bacteria grow readily. Gas gangrene microbes are serophytes of acidosed blood fluids.

4. Whole blood constitutes a medium of essentially the same qualities as the serum. In it, as a rule, only serophytes will grow, and usually only the streptococcus and staphylococcus.

B. From a study of the behavior of leucocytes in presence of bacteria the authors conclude that what is essential to the achievement of bacteriocidal effects is the employment of freshly emigrated leucocytes, the keeping of these alive and the removal of the excess of serum which would carry the bacteria out of reach. It is therefore obvious that the problem of sterilizing actual wound surfaces must be soluble along these lines.

C. On the possibility of sterilizing the superficies of a wound the authors believe there is no doubt, provided the surface has been washed quite clean from albuminous substances.

D. Practical Applications of Experiments: 1. Early primary suture stands on the same footing as primary suture following ordinary surgical operations. In both cases we are closing healthy tissues in which there is at most a minimal microbic implantation. In both cases, — except when we have dead spaces and allow these to fill with lymph and have in these a streptococcus implantation, — the body can very safely be trusted to deal with the few scattered microbes.

2. Treatment of foul wounds that have never been opened, cleansed, and resected, or wounds that have been closed without adequate cleansing, as well as originally clean wounds that have been neglected. The first step is to clean off the sloughs which favor every species of bacteria. Then when the surface is healthy get rid of the serosaprophytes. Triptic digestion accomplishes the first — whereas the second is accomplished by impouring of wholesome lymph. This digestion can be accelerated by soaking the wound with 5 o o salt which also acts as a lymphagogue and stops the serosaprophytic infection. The serophytic infection is held in check so long as the concentration of salt in the discharges is maintained at a high level.

3. Treatment of gas gangrene infections. Necrotic tissue here should be removed with knife: altered lymph should be replaced with wholesome lymph. After excision, therefore, a local lymphagogue hypertonic salt solution is clearly indicated. Antiseptics are of no value whatsoever, as they can not penetrate sloughs or pockets of pus or infected tissues, nor do they influence that corruption of the discharges which favor the growth of every species of microbe.

4. Treatment of clean wounds. Here the sterilization must be completed by destruction of serophytic bacteria. Recourse may be had to the patient's leucocytes or to chemical antiseptics.

E. The authors conclusions are as follows:

1. It has been erroneously inculcated that every wound should be sterilized before closure; and that, therefore, primary suture should be avoided and secondary suture undertaken only after a course of antiseptics. There is now no question, with respect to primary suture, that the wound taken after early surgical cleansing and resection is as good as sterile: and, with regard to secondary suture, undertaken with a wound in good condition and a purely serophytic infection, that such operative procedure, provided it leaves behind no infected dead spaces, directly contributes to sterilization.

2. It has been taught that we should judge of the fitness of the wound for closure by necro-pyo-cultures and direct microscopic examination of the pus. We have learned that it would be infinitely more reasonable to base our judgments upon the results of bio-pyo-culture.

3. It has been taught that suture cannot be successful in a wound containing a hemolytic *Streptococcus pyogenes*. We have seen that leucocytes can, given proper conditions, successfully combat this, and of course all other streptococci: and that these

conditions can be realized in connection with the suture of wounds.

4. It has been taught that for the removal of sloughs from foul wounds chemical solvents are required. We have learned that sloughs can be removed by tryptic ferment set free from disintegrated leucocytes, and that the liberation of this ferment can be greatly accelerated by breaking down the leucocytes in the discharges with hypertonic saline solution.

5. Lastly, it has been taught in connection with antiseptics that sterilization is obtainable only by continuous or very frequently repeated application. We have learned that there is nothing to prevent any part of a wound surface, which has been washed quite clear of albuminous matter, from being sterilized by a single application of antiseptics.

A Report on 2537 Cases of Primary Suture of War Wounds. By René Lemaitre. *Lyon Chirurgical*, Jan. and Feb. 1918.

This report is based on 29 months experience with the control of end results. Lemaitre operated before the seventh hour in 295 cases; in 1862 cases between the seventh and fifteenth hours, and in 126 cases after 15 hours. In all he did 2537 primary sutures, 209 delayed primary sutures and 307 early secondary sutures. In the early period of his experience he did primary sutures in only 44 o/o of the cases — now he does it in 79 o/o.

He does not do a primary suture under the following conditions:

1. When the wounds are slight and not likely to be infected: as, for example, small fragment wounds of face and hands without injury to bone tendon or joints. As these missiles have not passed through clothes they are not likely to lead to infection.

2. Punctiform, transfixing wounds due to rifle balls without bone, joint, vascular, or nerve lesions.

3. When the general condition of the patient is bad and when the pulse is 120 or more.

4. When the time following the injury exceeds 24 hours. The earlier the operation of primary suture, the better the results.

5. Whenever there is a change in note about the wound, suggesting presence of gas as heard by the stethoscope. In these cases it is safer to do a delayed suture.

6. Never do a primary suture in a part distal to a ligated essential or terminal artery.

Technic of Excision and Primary Suture. Lemaitre removes all tissue dead and dying along the whole tract by making an incision around and close to the wound of entrance and enlarging it up and down or transversely as indicated. All foreign bodies are carefully searched for and removed as well as all loosened pieces of bone. Blood vessels are tied with fine catgut and only the vessel wall caught in the ligature. Nerve lesions are sutured at once, and if near a fracture the nerve suture is protected with muscles by canalization; otherwise this is not necessary. Most vascular lesions require double ligation; small lateral wounds may occasionally be sutured. Articular injuries are carefully cleaned and repaired, bone injuries are cleaned, loose pieces of bone or fragments removed, the periosteum is saved, sharp points are trimmed off, and the marrow adjacent to the fracture is scooped out and parts immobilized. Severe bony injury in articulations may require immediate resection. Muscles and aponeuroses are excised liberally along the tract of the wound even well into healthy tissue. Tendons, if cut, are sutured after freshening ends, occasionally anastomoses may be necessary. All contused hemorrhagic subcutaneous tissues should be excised. *In the excision of the wounds a curved scissors is the most useful instrument.* After making these excisions Lemaitre washes the wound with 5 o/o tincture of iodin which not only sterilizes the surface of the tissues but dries the cut surfaces. The wound is then drawn together with a small thread drain, as experience has shown that there is likely to be some discharge as the result of the use of the tincture of iodine. The drainage threads are removed in 3 or 4 days as a rule and the skin stitches in the middle of the second week. In some cases, owing to the presence of the above mentioned contraindications to primary suture, a delayed primary suture is to be done. Lemaitre makes a primary excision or débridement leaving the wound wide open covered with a dry dressing which remains in place 5 to 6 days. He makes no use of Dakin's solution as he has seen no benefit therefrom. At the dressing he washes the adjacent skin with oleate of sodium soap, dries with ether, and washes wound with tincture of iodin. If the bacteriological control (absence of streptococci Tissier) is satisfactory, a secondary closure of the wound is carried out. Experience has shown that neither those wounds which are closed originally or these that are closed secondarily are bacteriologically sterile. Lemaitre feels sure that he has done successful primary sutures in wounds containing streptococci.

Post-operative course of primary suture cases is usually very satisfactory. About 95 o/o heal without any trouble. Partial and

complete failures occurring in the remaining. Pain, increase in pulse rate, rise in temperature, disturbance in general condition with local tenderness will usually indicate that there is infection in the closed wound.

A New Adhesive for Traction. W. F. CUNNINGHAM, 1st. Lieut., M. R. C. Preliminary Note of an article to appear elsewhere.

The material which has been used is a solution of celluloid in acetone. It is more reliable and efficient as an adhesive than those in vogue at the present time and is easily prepared. A particular advantage, however, is that the desired traction may be applied immediately.

For general purposes a solution of 7.5 g. of celluloid in 100 cc. of acetone is found to be the best. This percentage may be increased up to 10 g. per 100 cc., where only small areas of skin are available.

It is prepared by placing small pieces of celluloid scrap in a dry, clean, moderately wide mouthed bottle securely stoppered, and is shaken at frequent intervals. It makes a clear homogeneous, syrupy fluid and is ready for use in from 48 to 72 hours. Owing to the volatility of acetone, precautions should be taken to prevent evaporation. One liter is sufficient for at least 30 applications.

Mode of Application. No preparation of the skin is necessary; it should, however, be dry. Shaving should be avoided as the hairs increase its effectiveness. Iodine and also picric acid and alcohol should be avoided as far as possible on areas to which any type of adhesive is to be applied. Both of these drugs increase exfoliation and are often responsible for early slipping.

The solution is poured on to the skin and distributed with a small, rather stiff brush. Canton flannel strips are found to be the best material for traction bands. They should be applied *immediately* and smoothly and a thin coating of the solution used over them. A circular gauze bandage should then be applied.

Twenty-five applications have been carefully observed over periods of from 10 to 43 days. The substance itself is not irritating, but blistering may occur at the margins of the strips when excessive traction is used.

The following are a few examples of experiments:

1. Traction suspension apparatus for fracture of femur. Adhered area for strips $6'' \times 3''$. Thirty lbs. of traction applied as soon as apparatus could be set up, and this was just less than 10 minutes.

2. 10 o/o solution applied to dorsal and plantar surfaces of great toe as far as metacarpo-phalangeal joint, and the entire leg suspended by means of muslin bands.

3. With a 6 o/o solution applied to forearm, area 1 3/4″×6″ using Canton flannel strips, sufficient traction was exerted three minutes after application to pull patient and hospital bed, without castors, several feet and strips were still holding.

Conclusions.

1. 7.5 o/o celluloid in acetone makes an excellent adhesive material.

2. Its rapidly volatilizing quality permits of immediate traction.

3. It is insoluble in water — hence, not affected by perspiration or climatic changes.

4. Solutions which are likely to increase desquamation should not be used prior to application.

5. The natural process of exfoliation of epidermis limits the effectiveness of one application to about three weeks, though single application has adhered for 43 days.

Note. All experiments were done with combs, but through the kindness of the American Celluloid Company we have secured a a supply of celluloid scraps from which a far superior solution may be made.

Symptoms, Treatment, and Prognosis of Encephalic Wounds Observed in 56 Cases. By A. Moulonguet, and P. Legrain. A Report before the Société de Chirurgie, May 29, 1918. *La Presse Médicale*, June 13, 1918.

The authors consider only wounds penetrating the dura mater.

Out of the 56 cases, they observed motor disturbances in only 10. These were more frequently hemiplegic than monoplegic, and they were associated with more or less marked sensory disturbances, such as numbness of the upper limbs. Aphasia, hemianopsy, and Jacksonian epilepsy were observed three times each, and general epilepsy once.

In 14 cases, there were, at the time of arrival, the most completely diffused syndrome — deep coma. In two cases there were observed some of the characteristics of cerebral syndrome, like asynergy and adiadococcinesia.

Treatment: The authors raise the question as to the advisability of suturing primarily the outer skin as recommended by Gross, Houdart, and Tanton. The authors regard the practice as danger-

ous, for they insist that the conditions *sine qua non* of primary suture are complete débridement and excision which in many cerebral wounds are impossible.

The authors object further to primary suture on the ground that the brain pulsation is the most effective means of expelling devitalized tissue, foreign bodies, and bone fragments, — all of which favorable activity is defeated by primary suture.

They further dispute the soundness of the statistical argument in defence of primary suture, because they believe there has not yet been a sufficiently long experience of suture of brain wounds to establish positively the superiority of this technic.

As to operative technic, the authors prefer ether or local anesthesia to novocaine, adrenaline, or chloroform. They consider that this last, by reason of its action upon the brain, paralyses the natural defense against infection.

They make a star-shape incision with three points, carefully removing all contused tissue. Bone splinters are extracted by means of forceps and curette, guided by digital exploration.

Projectiles, whatever their size and position, should be extracted primarily, for they constitute a permanent menace. Extraction under a screen used intermittently is a most advantageous procedure. They insist upon extraction by means of the wound tract except when the missile is lodged in the side of the brain opposite to that of the entrance orifice. The electro-magnetic method of extraction, the authors find, is awkward because of the complicated nature of the machinery, and it is useless when non-magnetic bodies are involved.

Unless extraction can be accomplished before infection has set in, the authors think it better to run the chance that the seat of the infection may become encysted, and so permit of delayed extraction, than to attempt primary extraction when an abscess or inflammation has been observed.

The authors do not favor the use of drains for fear that the constantly pulsating tissues become ulcerated from the friction against the material inserted.

They believe the best treatment to be a flat dressing which will favor the repair of the meninges and maintain the cerebral equilibrium. Lumbar puncture they consider useless and even dangerous except in cases in which meningeal reaction or hypertension is clearly established.

The complications of meningitis, encephalitis, and cerebral hernia were not very frequent. Out of 56 cases, meningitis was observed in 7. Two of the cases recovered. Encephalitis was

more common, 12 cases. Cerebral hernia occurred in 6 cases.

The authors prefer delayed suture. In 16 cases this was accomplished at the end of about three weeks, without recourse to antiseptics.

The statistics of the 56 cases were as follows:

54 operated:

31 deaths (61 5 0).

23 definite recoveries.

The high percentage of deaths was due chiefly to the seriousness of the wounds and to the time elapsed before operation.

Nerve Wounds. By J. TINEL. Trans. from the French by Fred. Rothwell. Lond. Baillière, Tindall, and Cox, 1917. Price 15 s. net. French version, *Les Blessures des Nerfs*. Paris. Masson et Cie, 1916.

This book is based upon a careful study of nerve injuries as seen during the war. In attempting to reproduce the main thoughts of the writer in abbreviated form, it is impossible to give a smoothly flowing account of all the observations included in this admirable and extensive work. Among the numerous points made by the author, the following stand out most prominently.

Examination of paralyzed nerves should not be made until several weeks after the wound and then repeated every few weeks so as to study the progress in the evolution of symptoms. There is never any inconvenience because surgical intervention is postponed for two to three months after the injury. In the early weeks inhibition may simulate destruction. The paralysis of anesthesia is often more extensive than would be associated with the real lesion. Again muscular atrophy and hypotonia require several weeks to develop while pains due to irritation frequently appear only after eight to ten days and sometimes increase for a month. Formication due to nerve pressure appears about four to six weeks after the wound and reaction or degeneration only after three to four weeks following the injury. In all suspected cases faradic contractility excludes real paralysis except cerebral palsies. Every paralysed muscle is painless to pressure and this total insensibility is a clear sign of absolute nerve interruption — on the other hand pain of muscle bellies under pressure is the best sign of nerve irritation. Idiomuscular reflex is always intensified in peripheral nerve lesions despite hypo or even complete atonia. Trophic disturbances are absent or slight in almost all nerve interruptions

or simple compressions, whereas they are almost constant in nerve irritations.

The trophic disturbances described by Tinel are as follows :

1. Glassy skin which is dry, dull, and immobile.

2. Excessive sweating.

3. Desquamation in the area of the nerve.

4. Vasomotor changes, for example, cyanosis and redness and at times edema, — which may correspond more exactly to the nerve distribution than the sensory disturbances.

5. Ulceration is very rare and usually due to burn or pressure.

6. Temperature changes. Local rise in temperature present in slight nerve irritations.

7. Changes in skin appendages; hypertrichosis is almost constant.

8. Changes in the nails (grooving, splitting, curving, striation or atrophy) are common in serious nerve irritation.

9. Changes in bones articulations and aponeuroses and tendons with shortening of ligaments and muscles with possible loss of mobility due to ankylosis are not uncommon.

Symptoms of nerve interruption following section, very severe compression or bruising :

1. Immediate absolute paralysis.

2. Rapid disappearance of muscle tone.

3. Progressive muscle atrophy.

4. Reaction of degeneration beginning in two to three weeks.

5. Sensory paralysis.

6. Loss of muscle pain sense.

7. Pressure on nerve below lesion produces no pain or formication.

8. Absence of serious trophic changes.

Symptoms of nerve compression with loss of conductivity for the time being .

1. Paralysis usually as complete as that caused by nerve interruption.

2. More rapid but less intense muscular atrophy.

3. Relative preservation of muscular tone which is one of the best signs of simple compression.

4. Partial reaction of regeneration which is slow in evolution and is always incomplete.

5. Anesthesia variable in extent and degree.

6. Absence of pains at the level of lesion, in the course of the nerve or on pressure on the muscle.

7. Absence of formication (but there may be slight formication under pressure).

8. Absence of trophic disturbance is even more marked than in complete section.

Note: Only after a few weeks' observation can one judge of the necessity for surgical liberation. Simple liberation is usually sufficient. Resection would only be required if constriction has transformed the nerves into a fibrous strand.

Symptoms of Nerve Irritation:

1. Pain spontaneous in character: burning and pricking is characteristic.

2. The skin is hyperesthetic; at times, however, there is anesthesia of the skin with pain on pressure of the deep tissues. Frequently there is painful hyperesthesia which may exist with tactical and thermal hypoesthesia.

3. Trophic changes. In pronounced neuritic types, trophic changes are serious and while paralysis heals spontaneously, or after nerve liberation, pains however acute they may be, inevitably diminish whereas the trophic changes are obstinate, leading to fibrous changes which are hard to correct.

During the period of irritation the nerve is painful. Regeneration is slow and in obstinate cases liberation of the nerve gives variable results. At times resection is the proper procedure. In addition to the above severe neuritic type, there is, according to Tinel, what he calls an attenuated neuritic type and also a simple neuralgic type. The attenuated neuritic type is characterized by slight pain on pressure on muscle bellies, slight fibrous infiltration of muscle: a few aponeurotic or tendon contractions; slight cutaneous sclerosis with adherant integument. At times these contractions come on late, and the nerve injury having been associated with so few symptoms and so little irritation, it escapes observation. The simple neuralgic type follows slight bruises of nerve trunks often accompanied by more or less pronounced neuralgic symptoms. There are no paralyses, no trophic changes, only slight degree of weakness and no appreciable change in reaction. There is slight hyperesthesia to pin pricks instead of anesthesia. Opposed to this rather mild condition is the intense neuralgic type with burning pain called by Weir Mitchell and studied during the Civil War — Causalgia. This is found especially in the median and sciatic nerve. The pains come on usually four to five days after the wound. They reach their maximum in three to four weeks and then last months, gradually diminishing. The pain is severe, comes in paroxysms at the slightest touch or motion, though firm pressure may not cause pain. There is loss of sleep and appetite, the patient gets very irritable and unstrung. To protect their hands and feet they keep

their hands moist or pour water into their boots. Vasomotor disturbances are evidenced by redness and dryness with exaggerated sweating of the skin, and the hyperesthesia extends far beyond the cutaneous areas of the affected nerves, suggesting an irritation of vascular nerves or of the sympathetic periarterial plexuses. These cases are particularly obstinate and hard to treat.

Regeneration of nerves is progressive and scarcely ever begins before four to six weeks after nerve suture. Regeneration shows itself by the following complex symptoms :

1. As the axones develop there is progressive formication.
2. There is gradual return of muscle tone and muscle sensibility.
3. There is return of electrical normal contractility.
4. There is return of sensation first protopathic, then epicritic, with return of deep sensibility preceding the others.
5. Return of motion.

Prognosis : 60 o/o to 70 o/o of nerve injuries regenerate spontaneously: about 10 to 20 o/o of these would have improved more rapidly by liberation of the nerve or resection and suture. 30 to 40 o/o require operation. Nerve suture done under favorable conditions almost invariably succeeds. Of 108 cases of suture or graft there are only 14 failures (operator, Professor Delagenière): early sutures are followed by more rapid regeneration but success has been seen 15 months after original injury.

Indications for Operation : It is well to delay two to four months except in simple compression or severe neuritis in view of the fact that spontaneous cures take place and operation should not be undertaken if there are signs of regeneration. The operative procedures recommended are the following :

1. Liberation of compressed nerve. This liberation must be complete and if the nerve has been changed into fibrous tissue it must be resected and the ends sutured together without tension.

2. Resection of nerve. The two freshened ends of the nerve are brought together with catgut neurilemma sutures. If a small space 1 to 8 mm. is left between the ends of the nerve this can be spanned by neuroglia cells. Union, if the two ends are approximated, begins on the fourth day.

3. Occasionally it may be necessary to introduce a graft between two nerve ends that cannot be approximated.

4. Incision into nerve sheath at level of interstitial hematoma and evacuation of the irritating clot at times is very effective.

5. It has been suggested that in the neuritic types alcohol injections be made into the exposed nerves.

9. It has been recommended in the causalgia cases to denude the

arteries and veins of their perivascular sympathetic plexuses by circumcision of the vessels.

7. In addition to the operative treatment, the importance of protheses, diathermy, radiotherapy, electrotherapy and mechanotherapy should not be overlooked.

Temporary Cecostomy in Resection of the Distal Portion of the Colon for Non-Obstructive Conditions. By Major Gordon Taylor, R.A.M.C.(T.C.). *The British Medical Journal*, June 15, 1918.

The author described what he terms " a little surgical maneuvre " in the resection of the distal half of the large intestine (between the splenic flexure and the sigmoid colon). He advocates temporary or provisional cecostomy in cases of excision of a carcinotomous splenic flexure, descending, iliac, or pelvic colon, where no obstruction exists. The opening acts as vent for gases and prevents strain on the junction.

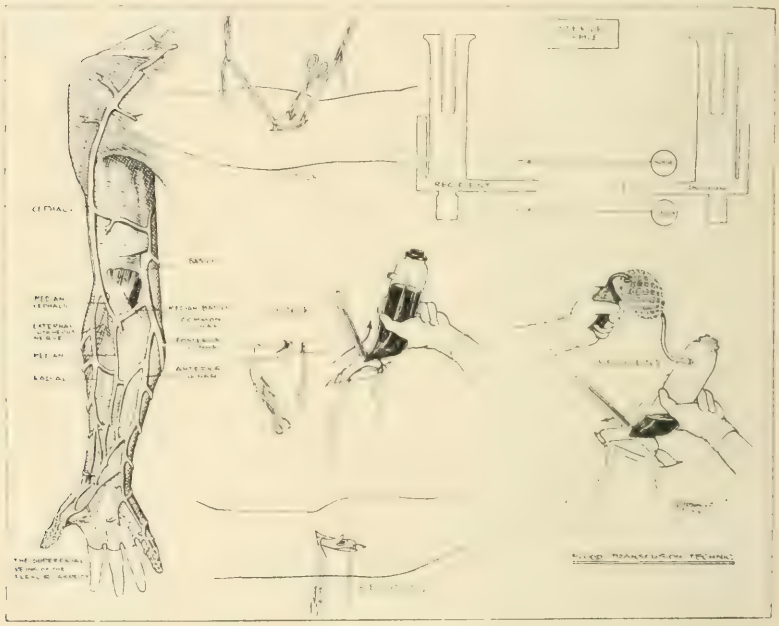
The author has also used cecostomy to close a proximal inguinal colostomy performed for gunshot wounds. He has usually performed an intraperitoneal operation, excising the " spur " and practising end-to-end union of the bowel. In the excision of a carcinoma and similar operations, he has found temporary cecostomy to be a measure of safety. A stoma is substituted in the right iliac fossa for one of the left side, but, if the cecum is simply anchored to the parietal peritoneum the opening closes readily. The drainage tube is inserted in the manner of a Senn's gastrostomy.

Excision of portions of the distal colon for gunshot injury is desirable in some instances, in spite of the general rule of abstention from operation for wounds of the large intestine, especially when there is infarcation of the bowel. Such a procedure seems preferable to the formation of an artificial anus in cases where resort to this operation is indicated. Excision has usually been performed in cases of gunshot wounds in the distal portion of the large intestine. Provisional cecostomy at the time of resection has proved to be a measure of safety. The " gridiron " method affords convenient access to the cecum. The drainage tube is inserted like a Senn's gastrostomy.

The author makes it clear that he does not advocate excision as an alternative to suture but as an expedient to which it is sometimes justifiable to have recourse. He attributes the idea of operating as described above to Sir Harold Stiles.

Blood Transfusion at the Front Area. By Benjamin I. Harrison, Lieut. M. R. C. Preliminary Note of an article to appear elsewhere.

The author's method of selecting donors and of grouping recipients was that described by Lee. A grouped list of all donors was available at a moment's notice day or night. By way of economy Group 2, 3, and 4 men were used. The indirect methods of transfusion were chosen, a vein of the flexor aspect of the arm, 3 cc. of 1 o/o novocaine being used for infiltration anesthesia. The



proximal end of the donor's vein was tied, and the distal end of the recipient's. A ligature loop was placed round the distal end of the donor's vein and the proximal end of the recipient's. Traction by means of a hemostat closed the veins.

With regard to diagnosis, the author remarks that in hemorrhage, the patient is generally restless and anxious, or worried about his condition. A shock-patient on the other hand is listless and apathetic. In extreme cases of shock, the patient is almost invariably of a grayish blue color.

In hemorrhage, a definite increase in the white blood count is found. In shock, there was no increase in the white blood count·

In acute hemorrhage transfusion of blood is specific. The effects generally are striking, immediate, and permanent.

In cases where there is both hemorrhage and shock, transfusion proved effective, but the results were not as good as those following transfusion for hemorrhage alone.

In shock without hemorrhage, if the patient had not yet reached the gray-blue stage, a certain amount of benefit followed transfusion of blood. If the patient had reached the gray-blue stage no benefit resulted from transfusion.

The Effect of Projectiles Allowed to Remain in Contact with the Walls of the Great Vessels. By René Le Fort. Report before the Académie de Médecine, June 11, 1918.

As frequently the elastic tissues of the vessel walls serve to stop a projectile at the end of its course, the author has sought to establish the effect of such contact by careful observation of a number of cases. He believes the following principle is borne out by his investigations. A projectile does not wear upon or perforate a vessel unless it is immovable before it.

Most projectiles so situated are small and easily moved, and hence are not injurious. They may, however, be so compressed against the walls of the vessel by external or muscular action as to cause serious friction against the rough edges of the missile.

The majority of vessel ulcerations due to the presence of foreign bodies are the result of infection. A bit of shell may carry dormant organisms for several years before they cause a serious infection. Such conditions are responsible for most cases of hemoptysis from unremoved foreign bodies.

The author enumerates the means of protection which prevent injury from the contact of missiles. The vessel and the missile are both encased in sclerous tissue which offers complete protection. The wall of the vessel in one instance was known to have developped in such a manner as to envelop a small shell fragment the size of a lentil.

Thrombosis is as rare as late hemorrhage. If a projectile pierces the wall of a vessel it results at once in a hemorrhage, in the healing of the vessel, or else in its complete obliteration.

The means of defense of vessels against injury are so effective that they should be taken seriously into account in judging the indications for extraction of foreign bodies. Pulsation of the body is not in itself an indication for extraction.

On the Use of Olive Oil in Blood Vessel Suturing. By Dr. J. Shelton Horsley, Richmond. *The Annals of Surgery*. April 1918.

It has been found that vaseline or other paraffin oil used to prevent adhesions of the intestines after abdominal operation have an intensely irritating effect on the normal peritoneum of the dog and that it is absorbed very slowly if at all. On the other hand olive oil is non-irritating and slowly absorbed but it prevents adhesions in only about 20 o/o of the cases.

With these facts in mind the writer has tried olive oil in blood vessel suturing in four experiments on two dogs. His results have led him to believe that the use of olive oil in such cases will be followed by a higher percentage of success than will the use of vaseline or paraffin oils.

The chief objection to the method is that the threads when wrapped around the buttons on the suture staff do not hold as well when boiled in olive oil as they do when boiled in vaseline. This may be overcome by smearing sterile vaseline on the buttons of the suture staff immediately before used, care being taken that the vaseline does not come in contact with the vascular endothelium.

ORTHOPEDICS

Cinematic Amputations in Italian Hospitals. A Report to the Chief Surgeon, A. E. F., by Major William S. Baer, M. R. C., and Captain Philip. D. Wilson, M. R. C.

Historical : The idea of cinematization was first conceived by Dr. Vanghetti in 1897-8, as a result of his observations in the Italian Abyssinian war. In this conflict the Abyssinians cut off the left hand at the wrist joint of those Italians under their dominion who proved traitorous to them. In consequence of this, all the muscle of the fore-arm remained intact. This fact led him to the study of the utilization of the stump, as an active force in producing movements of the artificial limb. Experiments were carried out by him on chickens, on account of their prehensile power. From these experiments, he was able to demonstrate that the muscles of the stump could be utilized for active mobility.

The first operation on a human subject was performed by Professor Ceci of Pisa about 1900. This work was soon followed by that of Sauerbruck of Germany, and by De Francesco and Galleazzi of Italy. While reports from Germany and Austria indicate that similar work is being done there, Italy alone of the Allies is showing much activity along these lines.

General Principles of Cinematic Amputations.

The general principles of Cinematization are based both on anatomical and physiological considerations.

Under our present methods of amputation the muscle power of the stump is lost. Under the cinematic method the muscle power is utilized.

All motion in a normal limb is accomplished by the antagonism of muscle groups. This physiological principle is utilized in cinematic amputations. It is accomplished by connecting at the end of stump the antagonistic muscles, or by giving them artificial insertion into the prosthetic apparatus.

Types of Cinematization. There are various types of cinematization. The surgical procedure varies according to the method by which the muscular attachment is made, thereby producing function in the artificial limb. The attachments are called motors. The motors most commonly employed are :

1. The club.
2. The loop.
3. The tendon tunnel.
4. The muscle tunnel.
5. Pseudo-arthrosis of the terminal stump segment.

1. The club is a projecting mass of muscle or tendon covered with skin, which being lassoed can be attached to the artificial limb.

2. The loop is formed by the junction of antagonistic tendons or muscles, completely surrounded by skin. Owing to its ringlike character it offers a convenient means of attachment to the artificial limb.

3. The tendon tunnel is a tunnel of skin surrounded by a loop of tendon and lying beneath the skin.

4. The muscle tunnel is a tunnel of skin passing through the belly of a muscle.

5. The pseudo-arthrosis motor is a small segment of terminal bone, with its muscles and tendons intact, which has been separated at its proximal end and rendered mobile. In this way it conveys its power to the artificial limb.

Centers of Cinematization in Italy. The following institutions constitute the chief centers of this work :

Institute Rizzoli, Bologna : — Major Putti, Captain Delitala.

All types of motor are selected to meet the needs of the individual case. Particular pains are taken to secure muscle antagonism by suture of muscles also to obtain free gliding surfaces. Examination of various cases after cinematization demonstrated that by this method a definite force could be obtained which could be utilized for actuating artificial limbs.

In connection with this hospital there is an excellent prosthetic workshop so that progress both from the surgical and mechanical side can proceed simultaneously. This seems very important.

Professor Putti, contrary to the opinion of most men, believes that the value of a stump is not altogether dependent upon its length, that it is the degree of impairment of the nerves controlling the muscles that is the most important. Before proceeding to a cinematic operation he applies three tests to determine whether the case is applicable.

1. Clinical method — Trying the development of the muscles, their mobility, and their contractibility by palpation.

2. Physiological method — Analyzing the power by movement of the stumps against resistance.

3. Anatomical method — Considering the amount of active muscle remaining and the skin available.

Only when when these tests are satisfactory does he proceed to operate.

II. *Ospedale Clinicale, Florence : — General Burci.*

Burci believes that the simplest possible motor is the best and that 25 o/o of all amputés are suitable for the application of this method.

Conditions necessary to have good result are :

1. Good muscles with good tonicity, not much damaged.
2. Non adherent tendons.
3. Sufficient skin to cover ring or club.

III. *Doctor Julian Vanghetti, Empoli, Florence. Italian Red Cross.*

Doctor Vanghetti, although not a surgeon, is the acknowledged author of cinematization. He believes at the present stage that simple motors are best, but with the greater perfection of prosthesis

a larger number of motors will be used. He says that it has been absolutely demonstrated that motors increase in strength with years rather than diminish.

IV. *General L. Bononio, General Medical Inspector.*

Bononio believes that the method is applicable and most useful in the upper extremity and that the single motor is best. He also thinks that amputations at the front should be performed by the flapless, plane section method. This causes the least possible traumatism to the muscle and thus tends to preserve its gliding action.

V. *Ospedale Ancili, Mantua.*

The director laid great stress upon the necessity of a flapless amputation at the front followed immediately by the application of traction to the skin in order to prepare the case for cinematization.

VI. *Ospedale Centrale Principale, Verona: — Captain G. Pieri.*

Pieri has performed 34 operations of this nature and has written several articles on the subject. He stands as one of the chief exponents of the method.

He states that all amputations at the front should be done from a physiological rather than an anatomical point of view. This means the preservation of muscle innervation. The saving of skin and the integrity of skin flaps by making incisions in such a way as to conserve their circulation. He calls this hypocinematization. He states that bone may be sacrificed if thereby muscular function is increased. The use of multiple motors is advocated and he prefers either the club, or an unusually thick loop. According to his opinion motors may be applied to all parts of the limbs save the upper third of the thigh and leg.

VII. *Ospedale Croce Rossa, Chiari: — Major Pellegrini.*

As a preliminary to cinematization, Doctor Pellegrini insists upon the early application of efficacious traction to the skin and for this has invented several ingenious types of apparatus to be used by ambulatory cases which at the same time permit of motion of the joint above the stump. By this method he is able to secure healing in most cases of flapless amputations. He insists that secondary amputations are practically never necessary. By preparing his motors above the end of the stump he is able to secure good surgical results at an early date.

VIII. *Pio Instituto dei Rachitichi, Milan:* — *Lt.-Col. Galeazzi.*

Colonel Galeazzi believes it is more difficult to obtain a good surgical result than is generally claimed. He states that tendon motors give less good results than muscle motors on account of their tendency to adhere. Single motors are the best. The question of obtaining sufficient skin is very important.

He lays stress upon the necessity of developing prosthetic apparatus before practical results can be obtained, especially in the upper extremity. At present the most that can be secured in the arm is the opening and closing of the prosthetic apparatus. However, on account of the lamentable state of arm amputés, at present, anything that offers possibilities such as this should be developed.

Conclusions.

The following conclusions are based upon personal examination of 35 cases of cinematization after operation, and reports of 165 cases representing the total number of operations performed by the surgeons visited, together with a thorough discussion of the subject with many surgeons interested in it.

1. At present cinematization is in an experimental stage. The results so far obtained have been of little practical value in improving the working efficiency of the amputé. Psychologically and esthetically it has been a distinct step in the betterment of the individual.

2. The results obtained are, however, of great importance in opening up a new field for future development. Based, as it is, upon sound physiological principles it seems reasonable to suppose that progress along these lines will bring results of great practical value.

3. At present much more progress has been made along surgical lines than along mechanical lines in the development of cinematization. The muscular power obtained by the surgical procedures has not been well utilized on account of the lack of mechanical efficiency in the apparatus.

4. In order to obtain further progress prosthesis and surgery, as applied to cinematization must go hand in hand. If prosthesis cannot adapt itself to the surgical procedure, then the latter must adapt itself to the prothesis. For this reason they must both be under the same direction.

5. Cinematization is at present more applicable to the upper than to the lower extremity. On account of the more delicate and

more complex functions of the upper limb as compared with those of the lower limb, present types of apparatus are much less efficient for the former than for the latter. The voluntary control which cinematization offers makes its use especially applicable to the upper.

6. The present development of cinematization, particularly in reference to prosthesis makes it important to use the single type of motor. With the further development of prothesis it is logical to suppose that a greater number of motors will be demanded. Whatever the kind of motor used, it should not interfere with the proper adjustment of the prothetic apparatus.

7. In order that American amputés may be able to benefit by future progress along cinematic lines, it is necessary that amputations at the front should be performed in a definite manner. The flapless amputation should be the method of choice. Muscles, skin and bone should be conserved and primary suture should only be done for amputés when these structures are not sacrificed.

8. Application of traction to the skin should always be made as a part of the treatment. The importance of this procedure cannot be over-estimated.

Recommendations. 1. Primitive suture of amputations should never be performed, when it involves the sacrifice of bone, muscles, or skin.

2. As a rule the guillotine or flapless method of amputation is advised, thus preserving the gliding effect of the muscles, length of bone, and skin.

3. Traction should be applied *immediately* to the skin after amputation, to preserve and increase its length and to retain the tenacity of the muscles.

4. All cases of amputation should be evacuated as soon as possible to an amputation center. That is, as soon as they are able to travel after their operation or amputation has been performed.

5. Cinematic operation should only be performed by surgeons who have direct control of a prosthetic workshop. Unless the workshop is associated with a hospital for the amputes, the patient will not derive the results which are possible.

6. An amputation center with a prosthetic workshop should be established immediately in the A. E. F. to care for those amputés.

7. One or more amputation centers should be established immediately in the United States for those cases which it is wise to return immediately.

MEDICINE

A Clinical Study of some Functional Disorders of the Heart Which Occur in Soldiers. By J. E. Mac Ilwaine, Former Physician in St. John Ambulance Brigade Hospital, B. E. F. *Journal of the Royal Army Medical Corps*, April, 1918.

The term "functional disorder" is one which is vague and wide, but for lack of a better it is to be preferred to the still more indefinite classification used in Army work, namely D. A. H. (Disordered Action of the Heart). The cases which are considered in this article have been described as functional because clinical examination failed to reveal any organic disease which could be held responsible for the evidences of cardiac disturbance.

One examination rarely proves adequate for the decision as to the disposal of the soldier, and it has been found necessary to use what is known as an "effort test", which consists of submitting the cases of doubtful pathogenesis to a six-weeks course of graduated physical drill. Roughly speaking, about one-half of the number treated were classifield as fit for active service.

The picture of the affection varies, but the important factor is the failure of the soldier to endure a moderate amount of effort or even a small degree of emotion, without collapsing or fainting. The histories given by the men are the same in substance, but vary as to the principal or predominant feature, i. e., pain, dyspnea, palpitation, vertigo, weakness, fainting, exhaustion, etc. A soldier will also complain of these symptoms occurring just as he is going to sleep, or else he will wake with the pain and palpitation and choking sensation.

In cases of this affection it was noticeable that if, for instance, a man did fall out on a hill, he was often able after a short rest to follow on and finish the march. The feature of these men after falling out has been their good color, hurried respiration, profuse sweating and tachycardia. The condition is so easy to recognize that the most one can do is to find out by clinical examination whether there is associated with it any organic disease.

To begin with all the men were considered as possible subjects of hyperthyroidism, unless that possibility was unsupported by examination. The condition of the tonsils and teeth was noted in

each man. Efforts were directed to determine whether there was any organic heart disease present, endocardial or myocardial. It was found in many cases that the syndrome was associated with definite organic changes in the respiratory or cardio-vascular systems, in a few cases with Grave's disease, and in some that the man was still suffering from pyrexia of uncertain origin.

The state of the nervous system as indicated by the reflexes would warrant the description of cardiac neurasthenics in two-thirds of the cases. It was strongly felt that the neurasthenic state had to be considered an important factor in forming a prognosis.

The writer delares that the etiology of the syndrome of " Irritable Heart ", " Soldier's Heart ", " Cardiac irritability " may be said to be emotion and intoxication, which two factors bring about a lowered threshold of stimulation in the involuntary neuro-muscular system. Then there is the individual response to these two factors to be considered in addition, an exaggeration of which may, under apparently healthy conditions, bring about the breakdown of the mechanism opposed to it.

Treatment. The author states that it was found impossible from a practical point of view that these men could be cured sufficiently for active service by hospital treatment, and it was then decided to try treatment by graduated exercise on the scheme which had been used at the Military Hospital at Hampstead. Consequently all suitable D. A. H. cases were sent to the convalescent depot, where excellent results were obtained by carefully maintaining a pleasant social-athletic spirit.

Prognosis. The problem of dealing with these men in the army is a simple one compared to the question of their treatment when the army has discarded them and they return to civil life.

A Roentgen Study of 1000 Chests at Camp Devens, Mass.. By E. L. Davis, Major, M. R. C. *Journal of the American Medical Association*. May 25, 1918.

The author presents his findings in more than 1000 chests. Some of the ideas expressed are practically new. The patients dealt with in this study are men between the ages of 21 and 30, officers and enlisted men of the army. All these men had passed the preliminary examination of local physicians. In practically every case reported in this paper the roentgen findings have been substantiated by the physical and clinical findings of examining surgeons.

He refers to instances in which the roentgen signs are decisive even though physical sounds are not found. Especially is this true

in the cases of deep-seated infections, and incipient tuberculosis in a part of the lungs other than the seat of the main invaded area. The fact that many tuberculosis lesions are not found on physical examination, and that lesions are frequently larger in extent than determined by physical examination, would lead to the generalization that many cases of chronic fibroid tuberculosis give few or at least very indefinite signs in auscultation or percussion.

In examining roentgenograms of pneumonia patients made shortly after resolution, shadows are seen which appear strikingly similar to those found in pulmonary tuberculosis.

The roentgen signs of lobar pneumonia are : (1) marked accentuation of linear shadows from the hila to the apexes; (2) marked enlargement of the heart shadow; (3) typical shadow of the localized area of consolidation in the lungs; and (4) high diaphragm on the affected side.

The markings appear early in incipient pneumonia and disappear early in resolution. In the majority of cases the shadows indicative of vascular congestion disappear early in resolution. With vascular congestion in the upper lobes, the early enlargement of the heart which seems to be due to toxemia can usually be demonstrated and is a definite sign of beginning lobar pneumonia.

Consolidation in the lung shows as a definitely localized homogeneous patch varying in density from complete opacity to translucency.

In the presence of consolidation it is difficult to determine when fluid is present in sufficient amount to demand aspiration.

The author has found that broncho-pneumonia, generally supposed to be a bilateral disease, is more commonly unilateral, and that the heart is sometimes slightly enlarged and often not at all.

His summary is :

I. *Pulmonary Tuberculosis* :

(1) Pulmonary tuberculosis is demonstrated on the roentgenogram even in its earliest stage. It is difficult to describe concisely the appearance of shadows that will enable the roentgenologist definitely to interpret active and inactive tuberculosis. One can only describe what in general is seen in well defined cases.

(2) The lungs may be divided into three regions with regard to the occurrence of pulmonary tuberculosis : the upper region; the middle region in which tuberculosis is sometimes found; and the lower region in which tuberculosis is rarely found.

(3) Consultation with clinicians has led to the conclusion that many cases of chronic fibroid tuberculosis give very indefinite if any physical signs.

II. *Lobar Pneumonia*:

(1) Lobar pneumonia and broncho-pneumonia are easily distinguishable on the roentgenogram.

(2) Lobar pneumonia gives the following roentgen signs:

1. Vascular-lymphatic congestion in the upper lobes.
2. Enlarged heart.
3. Localized consolidation.
4. High diaphragm.

(3) Vascular-lymphatic thickening appears early and disappears early, though its occasional persistence may be confused with tuberculosis shadows.

(4) Pneumococcemia shows definitely on the roentgenogram where there are symptoms of pneumonia without consolidation, suggesting that the seriousness of the attack depends more on the toxemia than on the extent of pulmonary involvement.

(5) The heart is involved before definite signs of consolidation appear.

(6) Cardiac enlargement persists for some time after all signs of involvement of the lungs have disappeared.

(7) Consolidation in the affected side is suggestive but cannot be considered a constant sign.

III. *Broncho-pneumonia*:

(1) Broncho-pneumonia is more commonly unilateral than bilateral.

(2) The heart is usually not enlarged in broncho-pneumonia.

(3) Broncho-pneumonia is often overlooked on physical examination, as the symptoms may be indefinite and non-characteristic.

The Urea Index as a Test for Kidney Function in a War Hospital, By Reginald Fitz, M. R. C. *Journal of the American Medical Association*. June 8, 1918.

Before each test the patient was given from 150 to 200 cc. of water, to insure a free flow of urine. One half hour later, in order to start with the bladder empty, he voided. The time of voiding was recorded to within one minute. About 36 minutes later, at least 3 cc. of blood were withdrawn from an arm vein into a dry tube containing a few miligrams of potassium oxalate to prevent clotting. At the end of 72 minutes from the first voiding, the bladder was again emptied, the urine carefully measured to within 1 cc., and used for analysis. The patient took no food or water during this period. Otherwise no restrictions were placed

on him. The 72 minutes period was merely for convenience, as being one-twentieth of 24 hours.

The permanent preparation of urea described by Van Slyke and Cullen was used, and determinations were carried out in the manner described by them, with a few necessary modifications. Three analyses are necessary: blood urea, urine urea, and urine ammonia. The acid used and alkali used in titration are fiftieth normal and hundredth normal alkali and fiftieth normal acid. To carry out the test the apparatus included burets for hundredth normal and fiftieth normal alkali, an aspirating set, and the few necessary reagents and the glassware.

The cases which have been observed are sufficient to show that the urea index test for renal function can be applied satisfactorily in a tent hospital with little if any laboratory facilities. While this procedure is never troublesome where asepsis is certain, under field conditions it is preferable to use intramuscular or intravenous treatment as little as possible.

On the whole, it becomes evident from the cases reported that the urea index is a feasible test for kidney function in a war hospital without particular laboratory facilities. As Mc Lean has said, the method is applicable in a wide range of cases, easy of performance, and gives results that prove of practical value in the recognition, prognosis and treatment of certain conditions associated with impairment of renal function.

Influenzal Sinus Disease and its Relation to Epidemic Influenza. By. H. E. ROBERTSON, Major, M. R. C. *Journal A. M. A.*, May 25, 1918.

In the summary of this important article the author condenses the facts in the following paragraphs:

1. Epidemics of respiratory influenza (purulent tracheobronchitis) have been fairly severe in both the American and British Expeditionary Forces.

2. In the investigation of cases, both clinically and at *post mortem*, little attention in the past has been given the question of accompanying sinus disease.

3. Of 8 fatal cases of purulent tracheobronchitis due to the influenza bacillus, all but one showed involvement of one or more of the sinuses at the base of the skull by inflammatory processes, probably in all cases directly due to the invasion of these sinuses by the influenza bacillus.

4. In 6 patients that died from other apparently independent infection, the sinuses showed influenzal inflammation.

5. Of 2 patients dying from accidentally received injuries, both harbored in their sinuses lesions giving pure cultures of B. influenzae.

6. Appropriate treatment of the sinuses in patients suffering from influenza often served to relieve the symptoms and apparently to hasten convalescence.

7. Investigation of the sinuses during epidemics of influenza is strongly recommended and urged not only on therapeutic but also on prophylactic grounds.

A Case of Late Tetanus. By EDWARD ANTOINE. *La Presse Médicale*, June 10, 1918.

The writer gives full particulars of an extraordinary case of late tetanus. There was a fracture of the right thigh complicated with gas gangrene. The patient could not be removed from the field for 30 hours, and the first dose of antitetanic serum could not be given until the time of removal. A second dose was given eight days later. Both doses were small (10 cc. each).

The wound healed and the patient started to walk. On the fourth or fifth day later (78th day after injury and the 60th day after the expiration of the immunity from the serum) tetanus set in.

The writer calls attention to the following peculiarities of the case:

1. The rarity of late tetanus after a second dose of antitetanic serum.

2. The failure of the tetanus to break out immediately after the expiration of immunity.

3. The probability that the organisms were encysted and set at liberty by the tearing of the newly formed tissues in the first effort to walk.

4. The combination of what apparently was both delayed and secondary tetanus, that is, tetanus postponed by the period of immunity and then brought out by a subsequent traumatism.

5. The localization of the first symptoms in the right leg and the later generalization in an attenuated form of the usual tetanic phenomena — trismus, collapse, respiratory disorders, — all of which symptoms disappeared in the course of 8 or 10 days, apparently as a result of rigorous treatment. The evolution was gradual and the local rigidity in the wounded limb persisted for about five weeks.

6. Attempts to stop treatment were followed by relapses or aggravation of the symptoms.

The author emphasizes the fact that stands out strongly in the case, namely, that *any definite traumatism is sufficient to bring to life a dormant tetanic infection, especially if the patient is not sufficiently immunized.* He thinks the case proves the efficacy of prophylactic injections, but he believes they should be given in doses of from 15 to 20 cc. He recommends the greatest prudence in allowing the seriously wounded, especially in case of open fractures, to walk or even to leave the bed until a period later than 60 days. He even believes a dose of antitetanic serum would be justified in certain cases before such an attempt.

He urges by way of treatment not only large doses of serum but also subcutaneous injections of huile phéniquée, carbolic oil, at the root of the injured limb and in the region of the fracture. He attributes the success of his treatment in this case to the persistent use of these injections.

Case of Tetanus Localized in the Limbs. By E. Chauvin, Médecin Aide-Major. *La Presse Médicale*, June 10, 1918.

The author reviews his conclusions drawn from six cases of localized tetanus that came under his personal observation. He rejects a limited conception of localized tetanus for one which would embrace all cases which begin with marked localization but later are generalized, or even fatal, and also those in which generalized symptoms appear first, but in which localization develops secondarily. In any case, there is a great variety of clinical pictures to be considered. The localized phenomena the author attributes to toxin conveyed through the nerves; the generalized phenomena, to that conveyed in the blood stream. The antitoxic serum, he believes, is capable of checking completely the spread of the toxin through the blood stream and hence it can prevent generalization if adequately administered at the right time. Sufficient serum administered so as to immunize the region of the wound may even prevent the impregnation of the nerves. Therefore, the author contends, the presence of localized tetanus means merely an insufficient serotherapy, and is not, as generally assumed, a modified form of infection. He urges the multiplication of preventive serum injections in all wounds that are slow in healing. If the localized tetanus has already appeared, indicating that the slow process of nerve absorption has set in, it may be maintained in the local

stage by adequate serotherapy. Tonics and sedatives help in such cases to offset the strain of the spasm.

NEUROLOGY AND PSYCHIATRY

War Psychosis. By Capt. D. K. Henderson. *Journal of Mental Science.* April, 1918. Vol. LXIV. N [illegible].

Henderson has made a study of 202 cases of mental disorder occuring in Home Troops and his valuable results answer the pertinent question "Who shall be recruited?".

His patients largely comprised those called up under Lord Derby's compulsory scheme and were confined to no one set of mental disorder, e. g., mental deficiency 61, dementia praecox 43, manic depressive 24, general paralysis 19, alcoholic insanity 77, traumatic insanity 12, psychoneuroses 10, paranoid states 8, toxic exhaustive insanity 3, epilepsy with insanity 3, organic brain disease 2.

These patients were all exposed practically to the same situation but each of them tended to react to that situation according to his inherent or predisposed constitution. He looks upon these cases not so much for their specific diagnosis or label as for "a reaction to a situation which could not be adequately met".

In the *Mental deficiency* group the symptoms causing the patient to be sent to hospital were of an exceedingly transitory nature, 45 of 61 cases being sent home at the end of a few weeks.

The great majority of this group had very evident outward signs of gross abnormality. Special emphasis is laid on the tendency, after head injuries, for head symptoms to reassert themselves as soon as a patient is subjected to a strain that is too great for him to meet.

In discussing the dementia praecox group, Henderson rightly calls attention to the important fact that "their sudden, impulsive homocidal outbursts are of a particulary dangerous character. Many untoward accidents happening on active service and during training would never take place provided greater care were taken (in regard to those who were enlisted) and in apportioning to men work for which they are suited".

Henderson suggests :

1. That cases showing mental deficiency, neuropathic and psychopathic traits, and giving a history and showing evidence of severe head injury, should for the most part be rigidly excluded from the army.

2. If it is necessary to recruit a certain number of these individuals, then it should be definitely ruled that under no circumstances should they be permitted to go on active service but should be given suitable work at home or at a base in France.

3. To effect the above object it is suggested that *a certain* number of mental specialists should be appointed to the recruiting boards, and recruiting medical officers generally should be given definite instructions to pay attention to all classes of probable mental defect or disorder and refer such cases to the expert.

4. At the large training camps there should be one mental specialist, whose business it would be to examine recruits and have those obviously unfit immediately rejected from the army.

5. It is only by adopting such methods as the above that we will ever come to grip with the wastage occurring in the army due to nervous and mental disease.

Note. These comments by Henderson are most pertinent and important, as it appears the R. A. M. C. have not adopted these methods. Every psychiatrist who has worked at the war-hospitals here could not help but be struck with the large number of obvious "dead weight" cases which have been unnecessarily, in fact criminally, dumped into the army.

So-Called Functional Symptoms in Organic Nerve Injuries. By John S. B. Stopford. Abst. of a Report to the Medical Research Committee. *The Lancet*, June, 8, 1918.

The author states that not uncommonly functional symptoms accompany undoubted organic injuries to the peripheral nerves. As Babinski suggests, this functional defectiveness may result from faulty operation and treatment, but the author believes that a large portion of such cases are due to a mixture of organic, psychic, and functional defects.

When the functional defect is the predominating symptom, there is danger that the weakness be attributed exclusively to hysteria when in reality an organic injury exists; hence the necessity to investigate the faradic response of all the affected muscles. Often there is a slight thermalgia in such instances.

When there are manifest organic symptoms the diagnosis is simpler. In one case a partially severed median nerve was found

to be involved in the scar, causing neuralgic symptoms when there was a forcible extension of the forearm.

Pain is a frequent localizing factor, but it should be remembered that where there is an organic defect the pain itself may sometimes be psychic.

The author regards an irritative organic element to be an almost constant attendant in these cases. Failure to obtain good functional results is frequently due to the neglect of this defect. Cases which stubbornly fail to react to treatment or soon relapse are probably those in which organic disturbance persists.

Somatic trauma undoubtedly plays a larger part in such cases than is generally supposed. It is often the exciting cause. There can be little doubt, however, that the predisposing cause is of psychogenic origin. Even those with no previous neuropathic history may be overcome by the nerve strain of battle and so develop hysterical functional disturbances.

The first aim of any method of treatment should be to establish positively whether there is present any somatic trauma. When once this defect is remedied, psycho-therapic methods of treatment should have every chance of success. In proceeding to this branch of the treatment, it is well to take the patient completely into one's confidence and to explain how the limb has been "forgotten" and how "consciousness" of it may be regained. It is advantageous to deal with sensory loss first, and this can be done most effectively by means of a faradic current with a brush electrode. This is a helpful preliminary to functional recovery.

In regaining voluntary movement, the patient should first have his attention fixed upon a simple movement, as extension or flexion, on the unaffected side. While this simple movement is being passively performed on the affected side, his attention should be transferred; as progress is often slow, the patient should have all possible help and encouragement. It is well to give him some light form of employment which calls for the exercise of the function in process of restoration. In no case should the limb in the meantime be immobilized.

Environment and emulation are important aids not only in recovery but in prevention of relapse. As one of the most frequent causes of relapse is psychical exhaustion, every effort should be made to give employment that would not expose the patient to emotional disturbance.

Tinel's Sign in Peripheral Nerve Lesions. By W. W. Mc Donald. *British Medical Journal*, July, 1918.

Mc Donald found cases where a well marked faradic muscular response was present when the nerve had been completely divided; he also found that the reaction of degeneration does not always follow the section of a nerve. He believes that electrical tests are of great assistance in arriving at a complete conclusion when taken in conjunction with other methods of examination, but they should not be regarded as final, as it is important that other methods of diagnosing the interruption of a nerve should have their true value recognized. He considers that, of these, Tinel's " le signe du fourmillement ", or the distant tingling on percussion (D. T. P.), is the most important. This sign depends on the fact that when young axis-cylinders are percussed, there is a sensation of tingling in the cutaneous area corresponding to the ultimate distribution of the axis-cylinders, e. g., if the musculo-spiral nerve is divided in the arm and the proximal end is percussed, no tingling will be felt by the patient. The whole area supplied by the degenerating part will be insensitive. When, later, regeneration occurs as early as 4-6 weeks, tapping over the site of the wound causes the patient to experience a tingling sensation in the skin over the dorsum of the 1st and 2nd metacarpals. When tingling in the hand follows tapping on the arm, this indicates continuity of the neurone between the arm and the brain.

If the new axis-cylinders are arrested or involved in a neurone the portion of the nerve from which D. T. P. can be elicited is never longer than 2-3 cms. and is situated at the site of the lesion. This is what is commonly found in interruption by neuroma or section.

As the axis-cylinders regenerate there is a *pari passu* downward extension of the D. T. P. and in healthy subjects growth takes place at the rate of 1-2 mm. a day.

When new axis-cylinders have completely developed their function, the D. T. P. disappears; this usually takes about 100 days; i. e., every 100 days ten cm. of regenerated nerve will lose its D. T. P. and the next ten cm. will show it. It is thus possible to study the progression of regeneration by this simple test.

This sign always precedes the return of muscular tonus, voluntary movement and normal electrical reactions by a considerable interval; therefore it is of great importance and value after operation for nerve graft or suture.

In cases where there is a nerve lesion in a limb with multiple

wounds, the existence of the D. T. P. indicates which wound is responsible for the nerve lesion, and in lengthy wounds it indicates the exact level of the nerve injury.

When D. T. P. can be obtained early in the second month for more than ten cms. below the lesion, one can affirm that the complete recovery will take place in a few months.

In testing the D. T. P., always percuss from the distal end and proceed slowly, otherwise there may be obtained a persistent sensation of tingling. Also, the limb must not be shaken too much for the same reason.

In the elderly, alcoholic, or debilitated subjects, where nerve regeneration is imperfect or altogether fails, D. T. P. does not occur and its complete absence gives a grave prognosis, The writer shares the opinion of others of wide experience, of not operating on nerve lesions till between the 4th and 6th month, except in causalgia where early operation is advisable.

UROLOGY AND DERMATOLOGY

Treatment of Wounds of the Pelvic Basin, Especially of the Bladder and Rectum. By M. J. Tanton. Report presented at *the Second Session of the Inter-Allied Surgical Conference.*

Tanton discusses the subject in four divisions, viz :

1. Isolated wounds of the pelvic basin.

2. Isolated wounds of the bladder; with or without concomitant lesions of the bony basin.

3. Isolated wounds of the rectum; with or without concomitant wounds of the bony basin.

4. Associated wounds of the bony basin.

Isolated Wounds of the Bony Basin. Under this heading is discussed the wounds that do not penetrate the abdomen because the bony lesion is considered of secondary importance to the intestinal lesions. 3719 cases were studied. Of these there were 1659 lesions of the ilium; 311 of the iliac crest; 659 of the sacrum; 24 of the coccyx; 21 of the sacrum and the coccyx; 20 of the wing of the sacrum; 120 of the sacro-iliac region; 202 of the pubic bone; 12 of the pubic symphisis; 47 of the ischio-pubic rami; 241 of the

ischium; 18 of the ilium and one ischio-pubic ramus; 52 of the ilium and of the acetabulum; and 321 wounds, the site of which was not precisely known.

2120 of the wounds resulted from shells, 773 from bullets, 136 from grenades and 108 from shrapnel.

The mortality rate was 10.37 o/o; 7.37 o/o died immediately and the secondary mortality was 4 o/o.

Anatomo-pathological Lesions. The penetration of the projectile, in the greatest number of cases, is produced through the hip, which explains the enormous predominance of lesions of the iliac wing; sometimes through the perineum, the lesion then involving the pubic bone, the ischio-pubic ramus or ischium; very often through the sacral region. Fracture of the head and neck of the femur is frequently associated. The lesions of the soft parts are variable. Sometimes in extensive fractures of the crest of the ilium the insertions of the large muscles of the abdomen and of the gluteals are destroyed. There also may be lesions of the sciatic trunk, or the sacral plexus.

Evolution. Complications. Shock is often severe and hemorrhages frequent because of the injury to the gluteal vessels. Infections develop rapidly on account of the extensive trauma. Gas gangrene finds here some favorable conditions for development. Rupture of the ureter sometimes causes a sub-peritoneal urinary phlegmon. Secondary hemorrhage and septicemia enter largely in the secondary mortality from lesions of the bony pelvis.

Treatment. Early intervention reduces the mortality. Wide excision of the contused soft parts, total esquillectomy, wide trephination of the iliac bone to remove the projectile and primitive suture of the soft parts are indicated when expedient. When infection occurs free drainage is demanded. In pelvic cellulitis the resection of the coccyx drains in a complete fashion.

Wounds of the Bladder. Associated lesions of the bladder and bony basin were more frequent than uncomplicated vesical injuries. The extra-peritoneal portion of the bladder was injured in 266 cases, while in 68 the peritoneal portion was involved, the latter being often accompanied by concomitant lesions of the small intestines and the colon.

Treatment. The author is convinced that every confirmed, or simply suspicioned, vesical lesion imposes an immediate surgical intervention. When the lesion is intra-peritoneal, or supposedly such, a laparatomy should be performed and the bladder and intestines carefully explored. The projectile will have been previously located by the X-ray and removed if it is in the bladder. The

contused borders of the vesical perforation should be excised, and sutured with catgut in two places, the intestinal wounds also sutured, if any exist, and the vesical cul-de-sac carefully dried out, the abdomen closed, leaving a drain in the pouch of Douglas for two or three days. He does not consider a retention catheter indispensable, if the bladder is catheterized every three hours for the first four or five days. The mortality rate of bladder wounds is high, 75 o/o of the cases reported, when the secondary deaths are included.

The indications for treatment of extra-peritoneal wounds of the bladder may be summed up as follows : surgical disinfection of the wound of entrance, and primary supra-pubic cystostomy in most cases. Experience has shown that many wounds of the bladder, by bullets or shell splinters, heal spontaneously.

Scabies in Military and Civil Life : Its Differentiation. Complications and Treatmeant. FRANCK CROZER KNOWLES. Captain, M. R. C., U. S. A. Preliminary note of an article to appear elsewhere.

There is probably no greater problem today in the fighting forces than the group of animal parasitic diseases.

During twelve months in a large British General Hospital 1500 of the 2000 dermatological cases were either frank scabies or secondary to the same. The following table will elucidate the differentiation clearly between pediculosis corporis and scabies.

Scabies.	*Pediculosis corporis.*
General indistribution, exclusive of the face and scalp.	General indistribution exclusive of the face, scalp, hands, feet, lower arms and the lower legs.
Predilection for the webs of fingers.	
Diagnostic signs, the burrow, a minute zig-zag line, consisting of alternating blackish and whitish dots.	Diagnostic signs, the pediculus small pin-head in size found in the seams of the clothes more frequently than on the body.
The eruption we speak of is multiple, consisting of papules vesicles and pustules, boils and large crusts. -	The eruption consists chiefly of long linear scratch marks.
	Small punctate hemorrhages and excoriations, not infrequently boils and crusts.
Itching severe, usually at night.	Itching severe, usually at night.

In military life scabies is a greater problem than in civil life because of the greater frequency and severity. Hands are involv-

ed in but a few cases. The penis usually shows a marked involvement, pustules, and burrows. In civil life complications are absent in most cases, whereas in the army there is an unusually large number of boils, pustules, impetigo and the so-called I. C. T.

Method of Treating Scabies.

1st day : Patient is given a warm bath and plenty of soap, one rubbing with sulphur (precipitated sulphur one dram to the ounce of Paraffin molle).

2nd day : Sulphur rubbing.

3rd day : Sulphur rubbing.

4th day : Sulphur rubbing.

5th day : Warm bath with plenty of soap. Clean clothes.

If active lesions are still present four more days of sulphur rubbings are given. A minimum of fifteen minutes is taken for the rubbing of each patient. The ointment is rubbed in with sufficient friction to open up all of the burrows. A thin coating of this ointment is purposely allowed to remain over the entire skin surface, excepting the face and scalp areas.

Treatment of the Complications of Scabies :

For all secondary pustular conditions : ammoniated mercury ointment, 20-40 grains to the ounce of paraffin molle. For boils : 25 o/o ichtyol. If boils continue or a large number are present, autogenous vaccines are indicated.

25 o/o of the cases were discharged cured in five days; 50 o/o in nine days; 15 o/o in sixteen days; and the remaining 10o/o required three to six weeks.

Petrol Dermatitis. By Surgeon G. B. Page. M. B. R. N. *The Practitioner*, London, May 1918.

Page discusses the dermatitis among aviators due to the prolonged contact of petrol-soaked clothing with the skin. He states that it is a frequent condition, particularly after aeroplane crashes, when the aviator may be pinned by the wreckage beneath a bursted tank, and so dazed or injured that he does not remove his petrol-soaked clothing for some time after the accident.

This petrol dermatitis resembles a burn or scald of the first and second degree. There is erythema, sometimes vesication, with burning pain of varying degrees. The area involved is often large, e.g., both legs, thighs, and feet.

The treatment recommended is a lead lotion applied on lint

or zinc-carbolic lotion (zinc oxid drs. 3, suspended in glycerin, oz. 1, in 1 o/o carbolic acid solution to oz. 8). This may be followed by a simple dressing powder after the symptoms subside, a process which fortunately is very rapid. The affected parts should be uncovered in weather, or else a cradle used to support the bed clothes.

In order to prevent petrol dermatitis after an accident, if the clothing is soaked with petrol, it should be removed as soon as circumstances will permit.

WAR MEDICINE

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Circulars, bulletins, and reports from the Office of the Chief Surgeon of the American Expeditionary Forces will also appear in War Medicine.

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EDITORIAL COMMENTS

THE WAR WOUND AND APPENDICITIS AN ANALOGY

In *acute appendicitis*, if the dead appendix is removed before the infection invades normal tissue, then the wound is immediately closed. Primary union follows and the patient is detained only to heal, and the vast possibilities of the inflammation of a great cavity are averted. If the dead tissue in the track of a *war wound* is excised, before living tissue is invaded, inflammation of a great mass of soft tissue is equally averted.

In *appendicitis*, even after the infection has penetrated the wall of the appendix and invaded the peritoneum, excision of the dead appendix facilitates the recovery; in *war wounds,*

even after the infection passes beyond the devitalized tissue, excision of the devitalized tissue facilitates recovery. In appendicitis, as in war wounds, if operation is performed during the stage of spreading infection, there should not, as a rule, be complete and immediate closure of the wound.

When an appendicitis has gone on to a localized abscess with an *organized* wall of granulations, then the surgeon would deal with the abscess as such; when in the war wound, the infection has gone on to new tissue organization and abscess, no débridement is done, but the abscess is treated as such. In the war wound, we find that the stage of contamination — i.e., before infection — of dead tissue corresponds to the period of time before the infection of a dead appendix penetrates the wall. Excise the dead appendix cleanly and the case recovers; excise the dead tissue in the war wound cleanly, and it recovers. In each, the process goes through identical stages — localized infection, spreading infection, abscess.

It was only after the surgeon learned to forecast accurately the *tomorrow* of the acute appendicitis and acted *today*; only after he took the initiative away from the disease, and attacked instead of defended, that he mastered appendicitis. As long as the surgeon waits to see what the war wound means to do, leaving the initiative to the infection, just so long will he fail to achieve mastery. To wait in the case of a devitalized war wound until the infection is spreading wildly — until there is pain, swelling, redness and tenderness — is to come to the rescue of the living tissue after it has been partially defeated. We must read the tomorrow of each wound accurately — read it and act on that reading now. We do not offer appendicitis an antiseptic — we offer it surgery.

Evidence is accumulating that the fever and pain and tenderness and swelling can be cut out of an infected wound under battle conditions. We have now seen that the mortality and the morbidity may within certain limits be reclaimed up to the third day, just as in appendicitis. The fourth day in the war wound, as in appendicitis, is the critical day. Why are operations so successful up to the fourth day? And why in the face of intense infection is the wound repair so rapid? Why is it possible successfully to close acute abdomens with much

infection? Why do the neglected, contaminated, but excised war wounds heal so well when the slightest infection causes failure in an operation for hernia? Because, in the case of the war wound, the local defenses have been called out actively; in the case of the hernia they have not. In the revised war wound there is increased blood supply, increased serum and increased phagocytosis. It is safer to have a breach in the aseptic technique in operations in an area whose defense is already heightened than in an area whose defense has not been heightened by injury.

The analogy does not end here, for if the appendix abscess is roughly handled there is caused spreading peritonitis, pylephlebitis, bacteriema, etc. If the infected war wound, especially if it has gone to abscess, is roughly handled, there is apt to be spreading infection, bacteriema, etc.

A war wound is appendicitis of the thigh, the leg, the arm. There is no difference in principle or in practice between the treatment of appendicitis and the treatment of war wounds. The time factor holds; the treatment is comparable; the natural defense identical.

THE NATURAL DEFENSE

The mere fact that man is surrounded, covered, and penetrated by an infinite number of bacteria and lives, is a proof that the human body has within itself adequate defense against bacteria. This defense we may presume was attained through struggle and survival — that is, through biologic adaptation, — and is the bulwark of the treatment of infection.

It is an interesting fact that the various parts of the body are endowed with differing degrees of power of defense. In general, the parts most exposed to infection by reason of injury, such as the external soft parts; or by reason of being in an infecting neighborhood, such as the intestine, the parts of the body exposed to injury and those exposed to infected areas are endowed with a mechanism for an efficient defense.

On the other hand, the inner protected parts — such as bone, especially bone deeply placed; and deep muscles and

protected organs and tissues, such as the heart, the brain, the spinal cord, the retroperitoneal tissue and fat — have had less opportunity to make a selective struggle, hence have weaker defenses. What is possessed by the tissue of the face that is not possessed by the mediastinum, or the femur? What is possessed by the peritoneum that is not possessed by the dura that endows them with a better defense? The part with weakest defense usually shows by comparison a limited blood supply, and when infected the reaction is mild, and is lacking in both the appearance and the fact of good defense. There is apparently no other difference as striking nor as marked as the difference in blood supply, either normally or in reserve, which may be brought out by infection. We may then infer that the means of defense is mainly in the blood.

A rich blood supply is then the key to the defense. The face and scalp, the external parts, and the abdomen, have a rich supply as compared with the deep lumbar muscles, the bone, the spinal cord, the retroperitoneal tissue. Not only is the normal blood supply less in these poorly defended regions, but the local vaso-motor mechanism is less developed, hence there is less reaction. For the highest defense there must be not only abundant blood, but normal blood. The bones, the deep tissue planes, the mediastinum, the spinal cord, the brain, the retroperitoneal space are all hazardous regions for infection. The surgeon should have in his mind the body charted like the sea, and should sail according to his chart. One region requires this conception, that plan; another, such as the scalp and face, no special plan. Face wounds heal well with good surgery — even with no surgery. The infected mediastinum, with no surgery, with poor surgery, with good surgery, does almost equally badly. A pulseless patient becomes a universal mediastinum. A limb anemic — as from a neglected tourniquet — from severing of arterial supply, becomes as helpless as the meninges: the patient in exhausion from cold and wet and exposure, and loss of sleep and fatigue from fighting, has a universally weak defense. Patients prostrated by shock or by hemorrhage have low resistance. As a rule, defeated, dejected troops have less resistance than victorious troops. The defense, then, in the

normal soldier varies with the several parts of the body, the frontiers of the organism being best defended. The defense, even at the frontiers of the organism, is lowered by interference with the local blood supply, whether of an entire limb, as strated, or of the devitalized bloodless tissue along the injured track of the missile; or of low blood-pressure from shock, with its secondary acidosis; or from hemorrhage; or when the entire individual is in exhaustion. The defense in turn is augmented by rest, sleep, fluids and revision of wounds, and by restoration of the local and the general blood supply. Excision of devitalized tissue, rest, a night's sleep, a transfusion of blood become valuable "antiseptics" and tend to restore and preserve the natural defense.

"SHELL SHOCK" NOT A MEDICAL TERM

Apropos of the editorial comment on "No More Shell Shock" in the August number of War Medicine is the announcement from the Division of Neurology and Psychology that "shell shock" has no place in the nomenclature of diseases among the soldiers of the American Expeditionary Forces. In a recent bulletin the Senior Consultant in Neuro-Psychiatry says that in spite of the fact that the circular regarding "Sick and Wounded" Reports states clearly that the term "shell shock" will not be accepted as a diagnosis of disability or death, it is still being used by medical officers in many tactical divisions and base hospitals.

The prevalence of the war neuroses in an army is in our own hands nearly as much as the control of infectious diseases. There are measures which tend to suggest functional nervous diseases and there are others which tend to prevent them. It is the duty of medical officers to try to prevent mental and nervous diseases as well as communicable ones, and there is no excuse for suggesting permanent or semi-permanent nervous invalidism to a man suffering from concussion or exhaustion by using the term "shell shock" on his diagnosis tag or field medical card.

If the medical officer thinks that a man has been concussed or is physically exhausted he should say so, and, if he thinks

that the soldier is suffering more from nervousness than from concussion or exhaustion, he should indicate the fact by using the terms provided in the nomenclature of diseases, or the symbol "N. Y. D." followed by "nervous" in parentheses. Many a good soldier is being lost to the front lines through carelessness in this respect, for few men can withstand the suggestion of disease when that suggestion is made by those whom they rightly regard as authorities in medical matters.

The control of the war neuroses is one of the great new medical problems of this war. Those directly responsible for dealing with the problem are working hard to minimize these disorders in the A.E.F., but they need the help of every company and regimental medical officer and every man on the staff of a base hospital. No medical officer should use the term "shell shock" either in reports or in conversation, nor should nurses and hospital corps men be permitted to use it.

It is not a medical term but a piece of military slang which applies to a large group of conditions; the name is descriptive of only a small proportion of all cases. It is not permitted in the British or French armies or in the armies of our enemies.

To discontinue using the term "shell shock" shows a desire to preserve man-power, to be accurate and clear in medical nomenclature and to follow regulations framed after thoughtful consideration; to continue using it shows clinical slovenliness, disregard for regulations, and indifference to the preventable wastage of man-pover. This is a little thing but so was the nail, for the lack of which the horseshoe, the horse, the rider and a kingdom were lost.

SUGGESTIONS FOR THE TREATMENT OF EYE WOUNDS

In the following condensed suggestions for ophthalmic surgeons and other medical officers who have to treat injuries to the eye, the Senior Consultant in ophthalmology has given volumes of sound advice.

Contusions of Eye Without Rupture. Guarded prognosis, watch tension especially if traumatic cataract develops. Look for and record any choroidal injury.

Contusions of Eye With Rupture. If extensive with great loss of globe contents, enucleate. If less extensive with little loss of contents, suture and cover with conjunctival flaps after freeing wound of any prolapsed tissue.

Penetrating Wounds. With foreign body inclusion probable, apply the magnet test. If this shows foreign body to be magnetic remove by magnet, preferably by anterior route if small, and if large through wound of entrance. If unable to remove small foreign body with the magnet at hand, send case to the Base Eye Center. Where foreign body is non-magnetic and not easily removable, follow expectant treatment, as such foreign bodies are often encysted. It should be especially emphasized that penetration of the eye by a foreign body, without a discoverable wound of entrance, is not an uncommon occurrence. All suspicious eyes should therefore be thoroughly investigated for a foreign body by means of the magnet, the ophthalmoscope and by the X-ray when necessary.

Penetrating Wounds Without Foreign Body Inclusion should be immediately covered with a conjunctival flap after freely removing prolapsed tissue, then treated as any eye wound. Where an eye is too badly injured to save, or where sympathetic ophthalmia is to be feared and no vision likely to result from conservative methods, the eye should be enucleated. At time of enucleation some material, preferably one of the large glass spheres, should if possible be emplanted in Tenon's capsule. If this cannot be done, it is at least imperative that the four recti muscles should be sutured together. In penetrating injuries of the eye, showing proptosis to a greater or less degree, a thorough perforation of the globe should be suspected.

Panophthalmitis. When a penetrating injury results in panophthalmitis it is best to eviscerate and this operation should be the one chosen for a hopelessly injured eye complicated by orbital cellulitis. After enucleation or evisceration artificial eye should be fitted as soon as the socket permits.

Orbital Injuries. A small foreign body in the orbit not easily accessible should be left unless cellulitis develops. Larger bodies should be removed, avoiding injury to muscles and nerves. Orbital cellulitis requires free drainage. Perfo-

rating wounds of orbits by bullets or other missiles should be treated tentatively. Lagophthalmos from the extreme exophthalmos, often seen in such cases, or the lagophthalmos resulting from facial palsies should have the lids sutured together to protect the eye if there are any signs that the cornea is likely to become involved.

TRENCH FEVER CAUSED BY A RESISTANT FILTERABLE VIRUS

At the Meeting of the Research Committee of the A. R. C. on June 29th, a report of the progress of the investigations of the Trench Fever Committee was read by its Chairman, Major Richard P. Strong.

The most recent contribution to the progress in medical science announced by this Committee is that Trench Fever has been proved to be caused by a resistant filterable virus. The completed report of the Trench Fever Committee is now being published by the Oxford Press for the American Red Cross in France, and it will soon be ready for distribution. The following is a summary of the report of recent researches on Trench Fever trade at the June meeting of the Research Committee :

" The experimental work undertaken in connection with trench fever has been practically completed. In these investigations 102 different human experiments have been carried out in connection with the study of the transmission of trench fever and its cause. Of these 28 have been in connection with blood transmission, 38 in connection with transmission by lice, 16 in connection with transmission by the urine, feces and sputum, and 20 in connection with the nature of the virus of trench fever. The disease has been produced experimentally by different methods in 62 instances. This is probably the first time in history where an infectious disease has been studied in such at horough manner on so many human subjects.

The most important facts which have been demonstrated by these investigations are :

1. That trench fever is a specific, infectious disease; that it is not a modified form of typhoid or paratyphoid fever, and is

not related, from an etiological standpoint, to these diseases.

2. That the organism causing the disease is a resistant filterable virus.

3. That the virus causing trench fever is present particularly in the plasms of the blood of trench fever cases, and that such plasms will produce the disease on inoculation into healthy individuals.

4. That disease is transmitted naturally by the louse pediculus humanus, Linn. var. corporis, and that this is the important and common means of transmission; that the louse may transmit the disease by its bite alone, the usual manner of infection, or the disease may be produced artificially by scarifying the skin and rubbing in a small amount of the excrement from infected lice.

5. That a man may be entirely free from lice at the time he develops trench fever, the louse that infected him having left him some time previously as its host, that the louse need only remain upon the individual for a short period of time in order to infect him.

6. That the virus of trench fever is also sometimes present in the urine of trench fever cases and occasionally in the sputum, and that disease may be produced in man from the introduction of the virus in the urine or sputum through the scarified or otherwise abraded skin.

7. That since the urine and sometimes the sputum of trench fever patients are infective, these should be sterilized in order to avoid the possibility of accidental infection from them.

8. That in order to prevent trench fever, or limit its spread, and thus save man power for the armies, greater efforts must be made to keep soldiers in general from infestation with lice."

PROMOTIONS FOR MEDICAL OFFICERS

The Chief-Surgeon has been working for some time to secure promotions for a large number of medical officers of the American Expeditionary Forces; but many obstacles have prevented ths consummation of his plans. He has, however,

recently worked out a system, that has been approved by the Commander-in-Chief, which will give to many medical officers a deserved increase in rank; and which is based upon an equitable consideration of age, seniority, experience, special qualification and gallant or distinguished service.

Blanks have been sent to the Commanding Officers of Divisions, Hospitals and other Units for reports on the character of the services and qualifications of the Medical Reserve Officers. Upon receipt of these reports, and when the proportion of officers allowed the Medical Department of the American Expeditionary Forces by recent legislation is determined, the promotions will be made to those who deserve them in so far as it is possible to determine the merits of each individual case.

The General Staff of the Army will not allow promotions above first lieutenants to men of the draft age in any branch of the Army except for special qualifications or gallant service. Therefore few medical officers under thirty may hope for promotion at this time. They should not be discontented with this ruling however, because many lawyers and other professional men of the draft age who have had the best college training are serving in the ranks, while all worthy physicians of the draft age are officers. Since a medical officer's age is computed by his actual age plus one for each four months of service, the man who is twenty-nine and who has been in France for more than a year may hope for promotion. All lieutenants whose actual age is about thirty-one and who have completed one year's service will be eligible to promotion as captain. There are also a number of majors to be appointed. Not all officers above the age of thirty-one will be promoted to captain, nor will captains be given majorities unless the reports from their superior officers should show that their promotions are deserved.

The Chief Surgeon, as stated in a Circular, recognizes the inequalities in rank due to the fact that the Surgeon General's Office in Washington could not investigate fully the claims of each of the thousands of physicians who came into the service in a few months; and he is sincerely and earnestly striving to give to each medical officer in France the rank that he

merits — in so far as the law allows him to make promotions in the different grades.

Medical officers of the American Expeditionary Force have been too busy in caring for the sick and wounded soldiers of our Army and in attending to their other daily duties to give much consideration to the question of rank. They have worked faithfully and without complaining in whatever capacity they have been called upon to serve, even though some have thought that their talents and attainments have not received the proper recognition in the matter of rank; but they will appreciate this effort of the Chief Surgon to give them the promotions which they deserve.

The extracts from the Circulars sent out by the Chief Surgeon bearing on the question of rank are published on page 267 ff. From them medical officers may decide whether or not they are entitled to promotion, and each may be assured that the Chief-Surgeon will carry out without partiality the plan which seems just and fair, and with due consideration for the facts in every case that is brought to his attention.

CIRCULARS AND BULLETINS FROM THE CHIEF SURGEON'S OFFICE

War Medicine publishes nothing of higher merit, from the scientific and literary viewpoint, than the Circulars and Bulletins prepared in the Chief Surgeon's office; and it could not carry to medical officers anything of more surpassing interest, or of greater importance to them, than the discussion of administrative and scientific problems in the Medical Department of the American Expeditionary Forces. Indeed, American medical officers cannot fail to feel a pardonable pride upon reading these official publications from the Chief Surgeon's Office, which show the really excellent work that is being carried on, and the high standards that are being maintained by those charged with protecting the health and the lives of the American soldiers.

These Circulars and Bulletins are not always published in their chronological order, nor are their numbers and dates given. Those of a confidential nature, and that contain infor-

mation of interest only to relatively small groups of men are omitted. Sometimes one subject will be discussed in several numbers of the C. S. O. Circulars and Bulletins, in which case the paragraphs relating to one subject are grouped and published together. For instance, all of the references to promotion of medical officers in three Circulars are published together in this number.

Because of lack of space, all of the Circulars and Bulletins of a general nature, even though we realize that they would be of interest to medical officers, can not be published in *War Medicine*. Only the most important, and those of especial interest to all medical officers are selected. They are chosen not only because they represent the most authoritative discussion possible from the pens of many of the leading medical men in America, both from military and civil life, but because, from the journalistic point of view, they present high-class medical literature on timely subjects that would appeal most to the interest of the physicians who are engaged with the problems of the medicine, surgery and hygiene of the war.

These extracts from the Circulars and Bulletins from the Chief-Surgeon's Office are indexed according to subjects, and the medical officers who keep their copies of *War Medicine* will thus have a permanent record of many of the most important documents that are prepared for their use. Reference to the files of Division Surgeons, and of Commanding Officers of Hospitals and other Units, will locate the number and dates of the mimeographed Circulars and Bulletins relating to the subjects dealt with in the extracts or excerpts from them that are published in *War Medicine*.

Editorial comment on the Circulars relating to the new plan for the promotion of medical officers is made in this number of *War Medicine*. Among other administrative matters dealt with in the C. S. O. Circulars, which are reproduced, and which are of interest to all medical officers, may be mentioned the plan of organization of Division Laboratories and Infectious Diseases, and the activities of the various branches of medicine embraced in that Division; the prophylactic use of anti-tetanic serum; and the administration of messes.

The excerpts from the Bulletins on Diseases from the Chief

Surgeon's Office in this number are timely and of much importance to medical officers generally. A note of passing interest is an observation on "three days' fever" or "Spanish Flu", which has been proved by the bacteriologist of the American Expeditionary Forces to be due to the Pfeiffer bacillus, and therefore the methods of prevention are the same as those employed in other epidemics of influenza.

With the military activities necessary to drive the Huns back into Germany, we shall expect many casualties among our soldiers, and therefore the brief articles extracted from Bulletins on shock and gas prevention extracted from the Bulletins of Diseases present absorbing topics that are dealt with in a very practical manner.

The article extracted from two numbers of the Bulletin of Diseases, entitled "A System of Venereal Prophylaxis", p. 283 in which the dignity of the "Professor of Prophylaxis" is upheld, and which contains a full description of the operative technic that has been worked out for the administration of venereal prophylaxis, is really medical literature of serious importance. If this "system" is followed throughout the army, it will aid in reducing the non-effective rate among our soldiers, and thereby increase the force and fighting efficiency of our troops.

MILITARY UROLOGY

The American Red Cross in France, in publishing the Manual of Military Urology by Lt-Col. Hugh H. Young, Director of Urology of the American Expeditionary Forces, has not only shown its desire to serve the American Army but has presented to the world a really great contribution to the science and literature of war medicine.

Lt-Col. Young, and his collaborators, Lt-Col. E. L. Keyes, Captains M. L. Boyd, Edward L. Oliver, W. H. Mook and D. M. Davis and Lieutenants J. E. Moore and William Jack, have prepared in this book of 300 pages an authoritative discussion on the prevention and treatment of venereal diseases, including the surgery of the urinary and male genital organs, that will be of immense value to the surgeons

of the American Expeditionary Forces in France. A section of the book is given over to dermatology, which is included in the Division of Urology of the Medical Department of the A. E. F.

The first two chapters, on the epidemiology and military control of venereal diseases, present very interesting data on their incidence in the British and French Armies and also among the troops of our enemies, the Germans and Austrians. They also give in detail the social and sanitary measures for preventing venereal diseases that have been adopted by the United States Army. The facts presented prove that our methods of handling this problem are not based upon moral and sentimental ideas, but that a practical working plan has been evolved, which will keep at a minimum the incidence of venereal diseases among our troops, thus enormously increasing the strength and efficiency of our fighting forces.

In the chapter on the " Early Diagnosis of Syphilis " the authors claim that spirochetes can be demonstrated in the primary lesion in a very large proportion of all cases, unless the chancre has been previously treated with antiseptics; and state that " doubtful cases of the remaining 5 to 10 0 0 must be regarded as possible syphilis ", and Wassermans made on them at the end of one and of two months.

The details of a standardized treatment for syphilis in the army are given and this is just as well adapted to treating syphilitics in civil life. Neosalvarsan (novarsenobenzol), manufactured by the French, has been adopted for army use because of the ease of administration, and the technic of administering it intravenously is described in detail. It is a modification of a French method by which soldiers can be treated without interfering with their work, except on the days of treatment. It therefore does away with the hospitalization of syphilitics, thus enormously decreasing the non-effective rate in the army.

The novarsenobenzol is dispensed in ampules of sufficient diameter so that a sterilized syringe can be introduced and the solution drawn out without having to be emptied in a glass vessel. It thus shortens the technic by one step, and lessens the chances for infection, since it is not necessary to sterilize a glass container for the solution.

The cyanide of mercury intravenously and Grey oil (40 o/o mercury) intra-muscularly are used in connection with the arsenic. The reactions from arsenic and mercury are described and the treatment for them outlined. The treatment and laboratory tests for the late syphilis are also discussed. Chancroid, other venereal ulcers, and inguinal adenitis are dealt with in a single chapter.

A routine examination of gonorrheal patients and a standard treatment for gonorrhea and its complications are described in detail. 5 cc. of 2 o/o protargol solution, injected into the anterior urethra 3 times a day, is used in acute gonorrhea until the purulent discharge is slight or non-purulent; and then a 5 o/o zinc sulphate solution or irrigation of permanganate of potassium, oxycyanide of mercury, or nitrate of silver 1 to 8000, increased in obstinate cases to a greater strength, even up to 1 to 2000, is substituted.

The section on dermatology is one of the most important in the book, since skin diseases are responsible for a large proportion of the non-effective rate in the army, and it is estimated that 90 o/o of them are preventable. Scabies, as was emphasized by speakers at the last meeting of the Research Society, is one of the commonest causes of temporary disability in all armies. Since the louse has been proved guilty of being the enemy that transmits typhus, relapsing and trench fevers, the de-lousing of soldiers, particularly after service in trenches that have been occupied by the Germans, has assumed considerable proportions as an army problem. The treatment, both curative and preventative, of scabies and pediculosis, as described in the Manual of Urology, has recently been carried out in several divisions of the A. E. F. with amazing results in reducing the prevalence of all skin diseases, thus considerably increasing the number of soldiers who are physically fit to serve at the front.

The appendix adds value to the book since it gives to the medical officers of the A. E. F. a permanent copy of many important letters and orders from the War Departement concerning venereal diseases. It also publishes the regulations concerning prostitution in France, and those regarding the sale or gift of alcoholic beverages to soldiers.

The Manual of Military Urology has been published by the American Red Cross in France for free distribution among the medical officers of the A. E. F. and of the armies of our Allies. The edition of 5000 copies has been nearly exhausted, but the type is being held to print another edition if there is a demand for it. Until the edition is exhausted, any medical officer of the A. E. F. or of the armies of our Allies may receive a copy on application to the American Red Cross Library, 12 place Vendôme, Paris.

LIEUTENANT GENERAL BURTCHAELL ON AMERICAN MEDICAL OFFICERS SERVING WITH THE BRITISH ARMIES IN FRANCE.

The medical officers of the American Expeditionary Forces who were present at the recent meeting of the Research Society were thrilled with pride by the remarks of Lieut.-Gen. Burtchaell regarding the American physicians who are serving with the British armies in France. The fact as brought out by Gen. Burtchaell that our medical men have served with the same degree of gallantry, that they have suffered an equal proportion of casualties, and that they have been awarded military honors proportionate to those of the British medical officers with whom they are associated, is a splendid tribute to their courage and ability.

This expression of appreciation from Director General of the Medical Service of the British armies will be read with gratitude by the American Medical Officers serving under him, and with pleasure and interest by their confreres in the American Expeditionary Forces. The stenographic report of General Burtchaell's remarks is as follows:

"Perhaps I may be allowed to preface the discussion on War Wastage, which you have so kindly asked me to open, with a few words which do not directly bear on the subject. I refer to the medical units and the individual officers of the Medical Corps of the United States serving with the British armies in France. The complete personnel of two General Hospitals arrived for service with the British armies over two years ago, and during the last twelve months six Base Hospi-

tal units of the American Expeditionary Forces have been doing admirable work at various British bases. In addition some 700 individual officers of the United States Medical Corps have served as regimental medical officers in British units and in field ambulances and casualty clearing stations.

" I desire to take this opportunity of expressing my appreciation of the efficiency and good services rendered by these officers and by the Nursing Sisters and N. C. O.'s and Men of the Hospital units. They came to the British army and took up their duties amidst conditions and circumstances with which they were necessarily unfamiliar, but nevertheless they quickly adapted themselves to their work with a degree of facility, aptitude and efficiency which has won the admiration of everyone with whom they have come in contact. I have had the pleasure of meeting many of these officers myself. I should like to meet them all and thank each one personnally.

" Those serving at the front have suffered losses, in common with others, and the ratio of battle casualties is practically identical with that of all medical officers of the British army in France during the war. Since your officers came to the British army twelve months ago, the percentage of losses among the officers of the R. A. M. C. was as follows;

	R. A. M. C.	U. S. A. M. C.
Total losses.	11.04	9.30
In Front areas	12.66	12.74
In Regimental Units.	12.35	12.35

" These very remarkable figures indicate that your officers were not wanting in carrying out their very arduous duties in the front line. From Commanding Officers and from all sections of the Medical Service I have frequently received reports of their excellent bearing and exemplary behavior.

" A number of officers have been specially mentioned in despatches; twenty-four have been awarded the Military Cross, and one officer has received a bar to his Cross. These awards have not been made because the recipients are members of the American Expeditionary Force and are consequently viewed from a different standpoint than that of British army officers. The reports on which these distinctions

were awarded were rendered in exactly the same way as in the case of officers of the R. A. M. C., and the awards were made, irrespective of names, from the facts recorded describing some act of devotion to duty or gallant conduct, and by selection from a very large number of such reports.

" The number of honors gained by the officers of your Medical Corps indicates a very fine spirit and bearing. I give you these details, as many of you maynot other wise have heard of them. I desire once again not only to express my appreciation of the good service rendered by your officers, but also to express the hope that the good fellowship and association which exists between a considerable number of the officers of your Corps and the officers of the Royal Army Medical Corps may continue and develop into a still closer bond of sympathy and co-operation. "

MAJOR-GENERAL IRELAND ON WHAT OUR ALLIES HAVE DONE FOR THE A. E. F.

Major-General Ireland prefaced his introduction of Major Haven Emerson's discussion of " The Sources of War Wastage in the American Expeditionary Forces " by a brief impromptu response to the remarks of General Burtchaell, who expressed his appreciation for the services which American physicians have rendered the British armies in France. General Ireland said that he was pleased to hear from the Director General of the British armies in France that the medical officers assigned to him had proved capable and efficient, and that he considered them fortunate in having had the opportunity to serve with British medical men, because the experience which they have thus gained will be invaluable to them.

General Ireland expressed the sentiments of those who have attended the meetings of the Research Society when he further said : " All of us appreciate what we owe to our associates, the British and the French. They have taught us the methods of modern warfare. They have taught us how to take care of patients in the front line and how to get them back to the hospitals. And they have come to the meetings of the

Research Society from month to month to tell us their experiences so that we may profit from what they have learned. It will result in an enormous saving of life and effort to the American Expeditionary Forces. Any help that we may have given so far in the way of officers, nurses or men, is but a small return for these services to us and for the sacrifices they have made in those past few years in warding off the attacks of the Hun."

COMMENTS ON THE RESEARCH SOCIETY MEETING.

At the last meeting of the Research Society of the American Red Cross in France on July 26th and 27th, a number of subjects of great interest and importance to medical officers were discussed. A full report of the meeting is published in this number of *War Medicine*, but, as has been suggested, editorial comments may call attention to and stress important points brought out in the discussions, thus perhaps adding interest to them.

FRACTURES OF THE FEMUR.

The first session was devoted to a symposium on the "Treatment of Fractures of the Femur", which was participated in by Médecin-Major Leriche and Médecin-Major Heitz-Boyer of the French Army, Major Sinclair of the British Army and Lt.-Col. Blake of the American Expeditionary Forces. It was brought out in the discussion that one of the causes of the bad results that have occurred in treating fractures of the femur has been that the medical officers who first applied the splints had not been properly trained in using them, or else were careless in applying them. One of the speakers said that in view of the fact that fractures of the femur are so frequent in modern warfare and that the result of treatment depends so much upon the first dressing, which might have to be done by any medical officer at the Front, it should be the rule of the army not to promote any medical officer who could not apply a Thomas splint properly. It was further suggested that

between battles medical officers should practice applying splints in order to be proficient in times of emergency.

It was also brought out in the discussion that the Thomas splint was in general use in the British and American armies, and that it was used and thought highly of by the French surgeons, but that other splints for treatment of fractures of the femur were used and considered standard in the French army. The apparatus exhibited by Major Heitz-Boyer showed great ingenuity, and seemed admirably adapted to a special group of cases, but he also spoke favorably of the Thomas splint.

It was evident from the discussion by the representatives of the French, British and American armies that they are not far apart in their methods of treating fractures of the femur. It therefore seems probable that a standard apparatus might be decided upon, which could be used in the three armies. This was thought to be highly desirable by the Research Committee for the following reasons :

1. After a battle, wounded soldiers of the French, British and American armies are often cared for in each other's hospitals and are later transported to the hospitals of the army to which they belong.

2. If one method is employed in the three armies — not necessarily to the exclusion of other methods — the splints and apparatus with which French, British and American medical officers are familiar are always on hand in the supply depots.

3. It is better for medical officers to learn thoroughly one acceptable method of treating fractures of the femur than to attempt to use several different splints and therefore not become proficient in handling any of them.

4. Since American physicians are on duty with all three armies, it is important for them to have the privilege of using one method, because if transferred to another service or if called upon to treat cases of fractures of the femur of soldiers of another Army, they should be familiar with the method followed by its surgeons.

The Research Committee therefore decided to request the Chief of the Service de Santé of the French Army, the Director General of the Medical Services of the British Army and

the Chief-Surgeon of the American Forces, each to appoint a representative, thus making a Committee of three to agree upon a standard method of treating fractures of the femur which may be adopted in the three armies. The following officers have been appointed : Lt.-Col. Blake, M. R. C., American Expeditionary Forces, Médecin-Major Heitz-Boyer, French Army, Major Sinclair, B. A. in France. They will probably be able to make a report at the October meeting of the Research Committee.

WAR WASTAGE.

" The Sources of Wastage of Men in War, with Suggestions for their Amelioration " was the subject under discussion at the second session of the Research Society. Lieutenant-General Burtchaell, Director-General of the Medical Service of the British armies in France, in opening the discussion gave the experience of the British armies, and graphically described the methods that have been employed to reduce the incidence of sickness among their troops, as well as those which have been found most effective in getting the wounded back into the line at the earliest possible moment. His remarks, as published in this number of *War Medicine* represent one of the most authoritative, as well as one of the most practical, expositions of the subject that have appeared in medical literature.

Colonel H. Ensor told of the " Wastage from Diseases Due to Lice " in which he showed that the lowly " crab " or " cootie ", in causing dermatitis, trench fever and typhus, is almost as much of an enemy to the human race generally, and to the Allied armies in particular, as the obligate anaerobic saprophytic parasite — the genus hominis Germani. Col. Ensor told of wastage due to lice in the British Army during the earlier years of the war, and of the de-lousing methods that had been employed, which have materially reduced the incidence of sickness among the British troops.

Lt.-Col. Brown, in discussing the " Prevention of Wastage in Convalescent Depots " gave the history and evolution of the convalescent camps of the British armies, and told of how the

lightly wounded and the convalescent sick were built up and hardened both in body and morale to get back to the line as fighting men in the shortest period of time.

Major Cowie discussed the part played by the regimental surgeon in preventing wastage of men. He kept the audience in a roar with his inimitable wit and humor, but at the same time he impressed upon the medical officers present many important facts regarding the duties and opportunities of the surgeon at the Front in preventing the loss of men from the firing-line.

General Burtchaell here gave a humoros account of an incident that happened to Major Cowie during a battle. He said that a shell exploded under Major Cowie's horse, and that the regiment was horrified to see the horse and rider go up in the air. After a time Major Cowie came down and did not lose a minute in dressing the wounds of the soldiers, but the horse was never heard from again.

Médecin-Major Hautant read a paper on " The Most Frequently Observed Oto-Laryngeal Affections and Wounds, and the Means of Treatment to Avoid Wastage ". He recited the experience of the French army in dealing with oto-laryngeal cases, and showed the importance of the prevention of acute infections like tonsilitis and otitis, and spoke of how wounds of the ear are dealt with to prevent deafness and chronic middle ear disease.

THE SOURCES OF WASTAGE FROM DISEASE IN THE A. E. F.

Brigadier-General Ireland, Chief Surgeon of the American Expeditionary Forces, was not scheduled as one of the speakers, but was asked to introduce Major Emerson whom he had detailed to discuss " The Sources of Wastage from Disease in the American Expeditionary Forces ". General Ireland said the present method of reporting the sick and wounded of the American Expeditionary Forces was modeled after the system in effect by the Medical Departments of the British Armies in France, and that all the records, which are now almost 100 % for the A. E. F. for the year ending May 31st, 1918, have

been tabulated with the aid of the recently installed Hollerith machines. The information for this first year's experience is now available by diseases, by months, giving the cases among officers, men and civilians, the deaths among these groups, the total days lost in hospital and in quarters, and the disposal of each case by death, return to duty, discharge or otherwise; and that from June 1918 forward it will be possible to give in addition the data as to the organization of the patient. The information is now tabulated daily and can be presented for any unit of time by grouping the daily reports. It will be particularly valuable now to compare our results with those of the corresponding seasons of a year ago when organization of preventive sanitation had made but little progress.

General Ireland further said that it is the expectation of the office of the " Sick and Wounded " not only to accumulate necessary records, and transmit them to the Surgeon General in Washington, but to make such immediate practical use of the daily reports, as soon as they are received, as will aid in the sanitary control and prevention of disease, and serve to assist and guide those chiefly occupied with the treatment of the sick. He concluded by saying that " a medical officer is judged by his morbidity and not by his mortality rates. To reduce non-effectiveness from disease to the lowest possible point is the immediate responsibility of the medical department. "

Major Haven Emerson in discussing " Wastage in the A. E. F. " gave a lot of interesting and suggestive data fresh from the new statistical machine in the Chief Surgeon's Office. He said that for a given period, prior to May 21, 62,714,000 days were spent by American soldiers in France. If the Germans desire any further proof of the fact that the United States has an army in France, besides the reception that the Prussian Guards and other picked troops received at Cantigny, Château-Thierry, and several other historic spots where the Huns have met the Americans, they should be provided with actual statistics. Statistics show that on account of sickness our troops lost or wasted 1,482,000 days of service. The problem, therefore, is what would the Americans have done to the Germans if they had not been so sickly? Now then, it is proposed to prevent these 1,481,000 days of sickness

in the A. E. F., which might be expected for the next year; and with American troops coming over since June 1 at the rate of more that 300,000 per month, and with the new draft act that provides for 13,500,000 more United States soldiers, it is quite possible that in a year or two the Kaiser may suspect that the Americans are fighting with the French and British.

These figures, however, are not quite as formidable as facetious minds would make them appear, because, according to the new statistical machine, the soldiers lost only 2.377 o/o of total possible days' service. It is, therefore, assumed that they were fit for fighting for the other 97.623 o/o of their time — a good " batting " average. The fact is, as Major Emerson pointed out, the health of the American troops in France has been remarkably good, much better than that of the same men in the United States, but this does not mean that a stillqetter record may not be made this year.

Mumps was the one greatest source of wastage of the youths of the American army ; bronchitis caused the second greatest loss of time ; venereal diseases ranked third ; laryngitis, pharyngitis, and tonsilitis ranked fourth, lobar pneumonia fifth ; measles was sixth, but broncho-pneumonia, which was so prevalent among the soldiers in the cantonments in the United States, stood thirteenth on the list. The other diseases which caused wastage in the A. E. F. are given by Major Emerson in the order of their importance.

The value of morbidity and mortality statistics lies in pointing out the prevailing diseases in order that those which are preventable may be reduced, or eradicated. Major Emerson in his address not only gave the exact figures regarding diseases that have caused wastage in the A. E. F., but also showed what was necessary to be done to combat them. His paper should be read by every medical officer in the A. E. F., each of whom should strive every day to do his part in eradicating preventable diseases among the soldiers who are fighting to make the world a better place in which to live.

TRANSPORTATION OF THE WOUNDED

The difficulties of transporting wounded soldiers from battle areas constitute one of the most serious problems with which an army has to deal. In the symposium of the Research Society on "Transportation of the Wounded" various phases of the problem were discussed in a way that will be helpful to the American army in developing its ambulance train transport service.

Colonel Gallie, who has had charge of the ambulance train service of the British Medical Corps, opened the discussion by a description of the development of the British hospital trains from only four primitive units in 1914 to forty-one trains, equipped as hospitals, with a total capacity of 25000 beds. Colonel Gallie designed the railway ambulance service for the British service, and the magnificent hospital trains that are now in use by the American army were made according to his design, and manufactured in England. He thinks it important that hospital trains be kept moving instead of waiting for a full load in the beginning of a battle. He outlined the methods employed in the British army in caring for the wounded on the hospital trains. Colonel Gallie also discussed barge transportation where there are available waterways. He thought it an ideal method of caring for severely wounded patients because there is no jarring or motion; but the barges should be thoroughly equipped, and each one should be in charge of a medical officer capable of giving wounded men thorough hospital treatment. He also dealt briefly with ambulance ships which are used in transporting soldiers to England.

Colonel Ensor discussed the evacuation of wounded men from forward areas, and said that in some sections of the British army horse-drawn ambulance wagons are used to convey wounded from the firing line to divisional dressing stations; and from there they are moved to the casualty clearing hospitals by means of G. S. wagons and motor "lorries". He thought it important that the main dressing stations should be situated on roads which the general supply wagons use in

going to and fro from the trains to the re-filling points, because instead of returning empty they may be utilized to transport wounded soldiers.

Colonel Poe of the British Medical Service spoke of the advantages of the motor ambulance convoy to an army corps, and stressed the importance of a continuous "flow of motor cars" so that there would be no delay at any point. He called attention to the heating of cars by the extension of the exhaust, the pipes from which are carried along in front of each seat; but care must be used for proper ventilation of the ambulance in order that the wounded should not be in danger of asphyxiation. Cars should always carry a sufficient number of hot water bottles and blankets to keep the patients warm.

Lt-Col. Thompson said that three important points should be stressed : first, distance; second, speed; third, the welfare of the patient during the journey. He thought the longer journeys were compensated for by placing wounded soldiers out of range and sound of the battle, in a surgical center where their wounds may be immediately and thoroughly attended to, particularly those with abdominal and chest wounds. He said that it could not be too strongly impressed upon motor ambulance chauffeurs that the greatest care and skill should be used in driving; and that in chest wounds, particularly, rough driving has been known to cause fatal hemorrhage.

Colonel Poe gave some general directions as to the preparation of the wounded for the trip, and for their care en route to the clearing station, or base hospital. He also dealt with conditions requiring special consideration, such as fracture, hemorrhage, etc.

Médecin-Major Proust, representing the French army, said that the ideal method of transporting the wounded man, once examination is begun, was uninterrupted transport to the place where his wounds could be looked after promptey and properly. He described the methods in use in the French army which he thought had been quite satisfactory.

Colonel Percy Jones, Chief of the American Ambulance Service with the French Armies, discussed the "Evacuation of Wounded by Motor Vehicles in the Rear Section of the

Advance Zone ". He said that no system will meet the needs under all conditions, as every evacuation on an unusually large scale from a battle area must be a rule unto itself. He thought it important to standardize ambulances, and said that he considered the Ford ambulance capable of going anywhere that a vehicle drawn by animals could go; that it was light; easy to run and maintain; and required very little road space. His tribute to the Ford car would make good campaign literature for " Henry ", in his race for United States Senate.

Colonel Jones insisted that time is the chief element in getting the wounded man to the point where his wounds can be looked after promptly. He said that this could be best managed by the organization of various zones for this purpose, and he gave the details of the plan that is in practical operation in the American Ambulance Service with the French armies. He thought that with any system sufficient elasticity should be provided for keeping in constant touch with the units served. He said that the ambulance driver should understand map reading, and should be thoroughly familiar with the roads and topography in the advance zone in which he is expected to operate.

The resume of the discussions before the Research Society on " Transportation of the Wounded ", as published in this number of *War Medicine*, makes a valuable contribution to military surgery at a time when the American army is making its share of the sacrifice necessary to crush German militarism.

CIRCULARS, BULLETINS AND REPORTS

ISSUED FROM THE OFFICE OF THE CHIEF SURGEON OF THE AMERICAN EXPEDITIONARY FORCES IN FRANCE.

Under this heading will be published extracts from circulars and bulletins issued by the Chief Surgeon of the Medical Department of the American Expeditionary Forces in France. It is believed that these will be of general interest and value to medical officers.

EXTRACTS FROM C. S. O. CIRCULARS

THE NEW PLAN FOR PROMOTIONS IN THE MEDICAL RESERVE CORPS.

1. The Medical Reserve Corps has not heretofore received promotions to which the Corps is entitled by law, because of the many difficulties which have presented themselves in working out a system which would be just and satisfactory.

2. Great inequalities occurred in the original commissioning of Medical Reserve officers by which men of mature age and high standing in the medical profession were made junior to others who were younger and of less professional experience. Further inequalities have been created by the promotion in the United States of younger officers who afterwards came to France with the increased rank which had been denied to members of the Medical Reserve Corps of the A. E. F.

3. A plan has now been prepared in this office which has met the approval of the Commander-in-Chief and which it is desired should immediately be put into operation. This plan recognizes that several factors should be considered in determining the rank of a member of the medical profession coming into the Army in time of war to give voluntary service.

(*a*) The first is age and the length of his professionnal experience, which constitutes, generally speaking, the asset of greatest value to the government which he brings into the service.

(*b*) The second is the length of his active service, which determines his miliiary experience.

(*c*) The third is the character of his military service, and whether it has been distinguished by unusual self-denial, gallantry, efficiency, or hardships which would entitle the candidate to advancement beyond others of the same professional and military experience. On the other hand, this factor may be one of inefficiency

or ill conduct which would in justice demand the withholding of promotion, or even separation from the service.

4. In order to accumulate the data for the determination of these factors in each case; it will be necessary to have commanding officers and Senior Medical Officers furnish recommendations in the case of officers of the Medical Reserve Corps serving under them. Individual reports have been requested in the case of each officer serving in France, whether he is considered deserving of promotion or not, except in the case of those under draft age. Officers under the draft age will not be promoted except in special cases where the officer has rendered unusually distinguished service and has been more than a year on active duty.

In making the promotions, the character of the service of the officer will be given consideration as follows :

A. Has it been of a satisfactory and creditable character such as, when his age, professional experience and length of service are considered, would entitle him to a higher grade; or

B. Has it been fairly satisfactory in positions not of great responsability, but not such as would warrant promotion to a higher grade; or

C. Is the officer, on account of professional ignorance, indolence, bad habits, or moral delinquency of any sort, undesirable for the military service? In this case, as full a statement as is practicable should be made of all the facts throwing light upon the shortcomings of the officer, and it should be stated whether he has been brought before a board of officers under G. O. 45, G. H. Q., 1918.

Policy Governing Promotions. An extract from the letter received by the Chief Surgeon from the Adjudant General of the A. E. F., which has recently been sent out in a circular, explains clearly the recently approved plan for promotion of the Medical Reserve Corps Officers serving with the A. E. F. It has also been extended to the Dental Reserve Corps and the Surgeon General has been requested to adopt it for these Corps in the United States. The corrective promotions authorized in the first paragraph will be made as rapidly as the reports called for are received and then promotions will be made according to the roster. Precedence in the roster will be determined by age and length of service, except that a value will also be given for distinguished service including wounds and decorations received and mention for conspicious gallantry.

The following will be considered the policy that will govern in

regard to the promotion of officers of the Medical Reserve Corps in the A. E. F. :

Policy governing promotion of Medical Reserve Officers.

(*a*) All officers of the Medical Corps in Europe will be placed on a roster according to age in each grade. An officer's age will be determined by his actual age plus four months for each month of service.

(*b*) All Lieutenants whose actual age is above thirty-one and who have completed one year's service, shall be eligible for recommendation for promotion to Captain.

(*c*) Promotion in general will be according to seniority, as determined by these rosters.

(*d*) Taking the number of first Lieutenants of the Medical Reserve Corps in the A. E. F. at any time as a basis, the number of officers in grades of Captain and Major shall not be greater than that authorized by the proportion of one Lieutenant to three and nine tenths Captains to one and seven tenths Majors (approximately the proportion between the same grades in the Regular Medical Corps at the time of the passage of the Medical Reserve Law).

(*e*) Recommendation on the part of the military superior of each officer, with a statement that his services have been satisfactory, will be required in each case of recommendation for promotion.

The policy with regard to promotion of officers in the Dental Reserve Corps shall be the same as that outlined above for the officers of the Medical Reserve Corps. The Chief Surgeon is authorized to forward at once any recommendations for promotion which he believes should be made, for the purpose of rectifying inequalities in grade due to mistakes in original appointments.

Form for Report as to the Character of Services and Qualifications of Medical Reserve Officers. 1. Full name and rank. 2. Date of birth. 3. Medical school from which graduated, with date of graduation. 4. Date when ordered into active service on Reserve Corps commission. 5. Previous active military service, either in U. S. Army or with National Guard in U. S. service. 6. Character of service of officer :

A. Has it been of a satisfactory and creditable character such as, when his age, professionnal experience and length of service are considered, would entitle him to a higher grade ; or

B. Has it been fairly satisfactory in positions not of great responsibility, but not such as would warrant promotion to a higher grade ; or

C. Is the officer, on account of professional ignorance, indolence, bad habits, or moral delinquency of any sort, undesirable for the military service? In this case, as full a statement as is practicable should be made of all the facts throwing light upon the shortcomings of the officer, in order that he may be brought before a board for the determination of his fitness for the service. Any available evidence in the form of correspondence or documents which is available should be forwarded in such cases.

State at beginning of answer whether service has been of Class A, B, or C, and write remarks thereafter.

Recommendations For Promotions. The attention of commanding officers of hospitals and other senior medical officers is invited to the fact that the form on the back of Circular 36 should not be used for the recommendation of Majors, H. R. C., because such promotions take these officers out of the Medical Reserve Corps and into the National Army. Promotions of this sort must necessarily be limited to a small class of specially capable officers, occupying positions of unusual administrative or professional importance. Such recommendations should, when made, be in the form of a special report giving with great fulness all the reasons for the promotion. They should not be made at the request of the officer interested, or except when such promotions are obviously in the interest of the service. The blank form with Circular 36 should be used, therefore, only for Captains and for Lieutenants about the age of 31 who are *Class "A" men.*

The responsibility rests with officers making recommendations to see to it that elderly men who have no administrative capacity, and no unusual professional accomplisments which would fit them for the grade of Major — in other words, men who belong to Class "B", are not recommended for promotion as Class "A" men. Lieutenants within the draft age should only be recommended for promotion in unusual and exceptional circumstances, where the individual has received a military decoration, or wound, or is a man of very unusual professionnal ability and occupying a position of such importance as to make his promotion of obvious advantage to the service.

Promotion and Demotion of Enlisted Men, Medical Department. The commanding officers of Hospital Centers are authorized to promote and demote enlisted men of the Medical Department between the grades of Private and Sergeant First Class, inclusive. They will sign warrants "For the Chief Surgeon", for men promo-

ted under this authority. The number of men promoted will not exceed the percentages authorized by law. Recommendations for promotions of soldiers of the Medical Department to the grade of Master Hospital Sergeant and Hospital Sergeant will be forwarded to this office for approval.

DIVISION OF LABORATORIES AND INFECTIOUS DISEASES.

1. Circular No. 2, Office Chief Surgeon, A. E. F., dated G. H. Q., A. E. F., November 1917, is amended in so far as it relates to the Director of Laboratories, American E. F.

2. A Division of the Office of the Chief Surgeon, A. E. F., is hereby created, to be known as the Division of Laboratories and Infectious Diseases. This division will be an integral part of the Office of the Chief Surgeon, A. E. F., and will be responsible to him through the Chief of the Division of Sanitation. The general organization of this Division will consist of a Director and the necessary number of assistants. The office of this Division will be located in the city in which the Central Medical Department Laboratory, A. E. F., has been established. Col. J. F. Siler, M. C., N. A., is designated as the Director of the division and the following named officers are designated as his assistants:

Col. George B. Foster, Jr., M. C., N. A., Asst. to Director, Section of Laboratories.

Major R. P. Strong, M. R. C., Asst. to Director, Section of Infectious Diseases.

Major Wm. J. Elser, M. R. C., Asst. to Director, Section of Laboratories.

Major Hans Zinsser, M. R. C., Asst. to Director, Section of Infectious Diseases.

Major P. A. Schaffer, S. G., Asst. to Director, Section of Food and Nutrition.

Major Louis B. Wilson, M. R. C., Asst. to Director, Section of Laboratories.

Capt. Ward. J. Mac Neal, M. R. C., Asst. to Director, Section of Laboratories.

This Division is charged with the following general duties:

Section of Laboratories:

a) Representative of Chief Surgeon in all matters relating to the laboratory service.

b) Organization and general supervision of all laboratories and the assignment of special personnel.

c) Advisor to the Supply Division, Chief Surgeon's Office, in the purchase or distribution of laboratory equipment and supplies.

(*d*) Publication of circulars relating to standardization of technical methods for protection of specimens and other matters of technical interest to the laboratory service.

(*e*) Collection and distribution of literature relating to practical and definite appliances in laboratory methods.

(*f*) Collection and compilation of statistics on routine and special technical work done in laboratories.

(*g*) Instruction of Medical Department personnel in general and special laboratory technique.

(*h*) Distribution and replenishment of transportable laboratory equipment.

(*i*) Co-operation and co-ordination with the Chemical Warfare Service, American E. F., and the supply of personnel and equipment.

(*j*) Supervision of the collection of museum specimens and photographic records for Medical Department activities.

Section of Infectious Diseases:

(*a*) Advisor of the Chief Surgeon in matters relating to the prevention and control of transmissible diseases.

(*b*) Collection and distribution of literature and preparation of circulars relating to methods of prevention and control of transmissible diseases.

(*c*) General supervision of laboratory research.

(*d*) Advisory supervision of all acitvities looking to the control of transmissible diseases, including direct liaison with Division Surgeon.

(*e*) Assignment of specially trained personnel and equipment for the investigation of epidemics or threatened epidemics.

(*f*) Experimental investigation of suggested prophylactic methods for the prevention of infectious diseases and recommendations relative to their general adoption.

(*g*) Collection of epidemiological data on infectious diseases.

(*h*) Co-operation and co-ordination with Water Supply Service, American E. F., in the supervision and control of water supplies.

Section of Food and Nutrition:

(*a*) Representing the Chief Surgeon in matters affecting the nutrition of the troops.

(*b*) Investigating army food requirements and consumption.

(*c*) Acting in an advisory capacity in the formulation of rations and dietaries of the American E. F.

(*d*) Inspecting food supplies and mess conditions with troops, hospitals and prison camps.

(*e*) Giving instruction in food inspection and handling, mess management and other measures for the maintenance of nutrition and the conservation of food.

4. The laboratories for the American E. F. will be of two general types, Stationary and Transportable. The Stationary Laboratories will include the Central Medical Department Laboratory, Base Laboratories for sections of the J. O. S. and for selected districts where necessary, Army Laboratories where necessary, Base Hospital Laboratories for individual Base Hospitals, Base Laboratories for Base Hospital centers and Laboratories for Camp Hospitals.

Transportable Laboratories will be organized for Evacuation and Mobile Hospitals and for Divisions. Their equipment will consist of standardized expandable units in chests and their personnel will be specially trained for the duties which they will perform.

5. Instructions concerning the laboratory service, of general interest to all Medical Department units functioning with the American E. F., will be issued in circulars from this office.

6. The Director of the Division of Laboratories and Infectious Diseases is authorized to issue special letters and circulars of instruction governing the organization and activities of this division.

Prophylactic Admistration of Anti-Tetanic Serum.

Circular No. 6 is amended to read as follows:

1. The attention of Medical Officers, A. E. F., is directed to the absolute necessity for the prophylactic administration of anti-tetanic serum (A. T. S.) under the following conditions:

(*a*) Immediately after the receipt of a wound of whatever nature or severity.

(*b*) Upon the recognition of so-called Trench Foot with or without skin abrasions.

(*c*) In cases of frost bite.

(*d*) During operations performed under conditions of unsatisfactory asepsis, e. g., emergency operations, operations for hemorrhoids, fistulae or any conditions where fecal contamination is a possibility.

(*e*) During secondary operations necessary in the course of the treatment of wounds received seven or more days previously.

(*f*) Following the manipulations incident to the reduction of compound fractures or dislocations, after the removal of adherent drains, or any other procedure resulting in a serious disturbance of the healing processes in a wound seven or more days old.

2. One prophylactic dose of 1000 units of Tetanus antitoxin

will be given to all wounded whatever, the nature or severity of the wound, as promptly as possible after the infliction of the wound; if a battle casualty, preferably at the Battalion Aid Station. This dose should be given sub-cutaneously, preferably over the lower abdomen. A second dose of 1000 units will be given in every case after an interval of seven days.

3. In severe injuries where prolonged suppurative processes persist, especially when fecal contamination of the wound per rectum or through intestinal fistulae is present and when much tissue necrosis occurs, three or even four doses may be indicated. The attending Medical Officer must bear this in mind and exercise judgment accordingly, in the individual case.

4. There is no objection to the use of 1500 units for the initial and the second prophylactic doses, but doses of 1000 units each afford sufficient protection. (Note. Tetanus Antitoxin from the United States usually contains 1500 units to the dose.

5. The serum should be administered by, or under the immediate supervision of, a medical officer. If for any reason this is impossible, it should be given by some responsible member of the Medical Department.

6. All injections with amounts and dates, signed by the officer administering them, will be entered on patient's Field Medical Card, by the letters A. T. S., followed by the date and hour. In the case of the freshly wounded the letter T should be marked plainly upon the patient's forehead with an indelible pencil.

7. Absence of any records on the patient's card or face as indicated in the preceding paragraph, is to be accepted as evidence that the A. T. S. has not been given. The first medical officer to assume subsequent control of a patient thus neglected should administer the serum immediately.

8. Medical officers who are thus compelled to administer A. T. S., because of the failure of any medical officer or officers previously responsible for this administration to carry out the above instructions, must make an immediate report of such emissions to the Chief Surgeon, A. E. F., through the Director of General Surgery, with sufficient data to establish the time and circumstances of the omission.

ANTHRAX.

The following letter from the Surgeon General, of July 6, 1918, is quoted for your information:

"I am directed by the Surgeon General to inform you that the number of cases of anthrax being reported to this office is

sufficient to attract attention at this time. Anthrax, so far as reported, has without exception appeared on the face or neck, and shaving brushes have fallen under suspicion, and in some cases anthrax organism have been isolated from them. For this reason, it is necessary that each case of anthrax coming to your attention be examined critically; that the man's shaving brush, talcum powder and other shaving accessories be obtained; that the organism be sought for with great thoroughness. For the purpose of testing brushes, it is recommended that inoculation of bristles from the brush be made into rabbits, guinea pigs and rats; nothing short of this may give conclusive results. Report should be made to this office of each case, giving the clinical history, the etiology, and the results of the examination of supposedly infected material. The shaving brush or other article from which the anthrax bacillus may be isolated must also be forwarded to this office with full information as to its source, name of the maker, and other data to facilitate its identification.

Administration of Messes: Function of Dietitian.

The reports of medical inspectors and officers of the Food and Nutrition Section show that the administration of the messes is, as a rule, the least efficient and satisfactory part of hospital administration. The defects noted are a monotonus and ill-balanced dietary, poor service, and lack of cleanliness in the kitchen and the kitchen personnel. These inspections show that Commanding Officers have not made proper use of the agency which is especially intended to correct these defects, that is, — to make proper use of the dietitians who have been assigned to the base hospitals, to use their expert knowledge for the correction of these defects, and to exercise the constant vigilance and attention to detail which is necessary for successful mess administration.

Dietitians are trained experts in nutrition and food preparation. If not trained nurses, they are civilian employees having a status analogous to that of a trained nurse. The function of the dietitian is to supervise the preparation not only of the special diets, but to make out the bills of fare and supervise the preparation of all food furnished by the government. The dietitian has expert knowledge of which the Commanding Officer should make the fullest use for the benefit of his command. She should be able to relieve the mess officer from the burden of details required to secure a well balanced ration, proper variety and preparation, and a good service. The mess officer should make a daily inspection, accompanied by

the dietitian and the mess sergeant, to see that the details of good service are carried out fully and completely.

Like all other women of the personnel of a base hospital, the dietitian is under the disciplinary authority of the Chief Nurse.

Instructions for the use of the Lyster Water Sterilizing Bag.

(*a*) The following instructions for the use of the Water Sterilizing Bag (Lyster) are published for the information of all concerned:

(1) Clean the inside of the bag thoroughly.

(2) Fill it to the white band, with water available.

(3) Place a tube of hypochlorite in an ordnance cup and break the tube with the butt of an ordnance knife. Mix the powder into a smooth paste with a little cold water, using the blade of the knife to break up the lumps. (Hypochlorite tends to lump when added to water and, therefore, special care must be taken to obtain a smooth paste.) Fill the ordnance cup about half full of cold water, stir and pour the nearly clear solution into the water in the bag, keeping the glass in the cup. Stir the treated water thoroughly.

(4) Fasten the cover on the bag and allow the water to stand 30 minutes before use.

(5) Never refill a partially emptied bag. Always empty the water from the bag before filling with fresh water.

(6) Use one tube of powder for every bag full of water. Tubes of hypochlorite are to be obtained from the quartermaster.

(7) Report any difficulties to the Medical Officer.

(8) Keep a record of the treatment attached to the card.

(*b*) Cards containing these directions on waterproof paper are in course of printing and will soon be available for issue.

Prompt Evacuation of Class "D" Patients.

Attention is directed to the policy of this office with respect to the disposition of all Class "D" patients. It is not intended to hold patients for prolonged periods of observation and study who are clearly destined to fall within this class, no matter how much professional interest they excite.

Such cases should be placed before disability boards promptly for classification, and as soon as they are able to travel by ordinary train they should be sent to Base Hospital No. 8, with a view to their transfer to the United States. If not able to bear travel upon ordinary trains, all such patients should be sent on a hospital train which will be routed regularly to collect such cases as are able to make the journey to the United States.

Therefore, as soon as a patient is classified as of Class " D " he should be considered as destined for transfer to the United States, since the intention is to evacuate to the United States all mutilated and disabled men for treatment, reconstruction, re-education, and final disposition. The necessity for this policy lies in the fact that the hospitalization program in the A. E. F. is based upon a definite priority schedule of building and of housing material, and also of tonnage space for medical supplies on ships from home ports, in direct ratio to the number of troops in France. The hospitalization program in the United States also contemplates the reception of a constant stream of evacuables from the Zone of Operations.

Biological Products.

The following biological products have been selected by the chief Veterinarian as all that are necessary for the American E. F. Supply Depots and Base Laboratories will carry these only in stock :

(*a*) Serum Antitetanic.
(*b*) Serum Antistreptococcic.
(*c*) Mallein Intradermal.

Authority to Authorize Expenditures and Approve Vouchers on Medical Department Funds.

Authority to authorize expenditures and to approve vouchers for purchases properly chargeable against Medical Department Funds, in sums not to exceed $250.00, is granted to the Commanding Officers of all Hospital Centers and to the Chief Surgeons of Armies.

The authority to authorize expenditures and to approve vouchers for purchases properly chargeable against Medical Department Funds, in sums not to exceed $100.00, is hereby granted to Chief Surgeons of Army Corps.

Hospital Trains.

When the Commanding Officer of a hospital is informed of the arrival of a train of patients for his hospital he will send an experienced medical officer and a sufficient number of enlisted men to unload patients from the train. This work is not to be done by the train personnel except in emergency.

Commanding Officers of base hospitals are authorized to issue expendable medical and surgical supplies to the commanding officers of hospital trains, taking the memorandum receipt of the train as a voucher for property return.

EXTRACTS FROM WEEKLY BULLETIN OF DISEASE

"Three day fever" — "Spanish flu" — Influenza.

The epidemic of respiratory infection which appeared first in the A.E.F. on April 15th in the vicinity of Bordeaux continues to develop in small out-breaks; during the last one 60 cases were admitted in the first 8 days of August. In the early periods of the epidemic, identification of the infecting organism was found to be difficult, but as the smears and swab specimens from nose and throat were taken earlier in the disease, in fact during the stage of congestion and when the constitutional symptoms were developing, the bacteriologists more and more commonly found the Pfeiffer bacillus in generous numbers. The A.E.F. appears to have suffered less than many of the groups subsequently affected, for the epidemic has appeared in a severe form in England and in Switzerland, causing a considerable proportion of serious pulmonary complications which were strikingly absent among the cases reported in May and June in France.

We may expect a continuation or return of influenza in the autumn and winter. The following simple measures put into effect by some medical officers during the past three months with good results are called to the attention of all medical officers as a basis for action.

(a) Early recognition and segregation of all cases of acute respiratory affections or fever in hospital.

(b) Prompt treatment by rest in bed and evacuation of bowels, and light diet at the beginning of the attack.

(c) Forbidding attendance at large public gatherings, "Movie" shows, concerts and dances during period of prevalence of epidemics of colds, coughs or "grippe".

Diarrhea.

Intestinal flux has been quite prevalent recently in the A.E.F. Whether we call it cholera morbus, dysentery, diarrhea, enterocolitis or acute intestinal indigestion, we can not blink the fact that the causes of practically every case have been preventable and well within the control of the officers and men of the A.E.F. The ingestion of dirty food and water is the simple and the correct explanation of the extensive epidemics which have caused a large burden of unnecessary suffering and inconvenience to our men in

every part of France. The dirt has in 99 o o of the cases been our own dirt, and the food and water have been of our own providing. Feces have got into the food. All varieties of infecting organisms, familiar to dwell are in temperate zones and plenty of tropical organisms have been identified. Among them the commonest have been Shiga, Flexner, Hass Y., Wheeler, Paratyphoid B, and the Entameba Histolytica.

Do not unload the responsibility for summer diarrhea upon the filthy fly: carriers, i. e., sick men with diarrhea, typhoids, dysenteries, etc., have served food in many kitchens. Officers and men, even in parts of France far from the turmoil and disorganization of the recently captured areas south of the Vesle, constantly drink water from unapproved sources in utter disregard of orders issued for their protection. A diarrhea of only one day followed by 3 days of constipation in a negro private of Engineers was found to be due to the Flexner bacillus. Most of those clinically recovered from what seems a simple dietetic diarrhea continued, as do typhoid convalescents, to spread their infection by hand contact with their fecal discharges. "That France has been well seeded must be acknowledged if one will but count the harvest. It is verily in our *own hands* to prevent a continuance or a recurrence.

Shock and its Remedy.

Whether shock be due to exposure, extreme physical exertion, insufficient food and water, loss of blood, violent and extensive injury, or a combination of these various causes, aid can be given at once whether the patient be a surgical case awaiting operation or a case of psychoneurosis. The latter exhibit many of the physical phenomena of shock better known as accompaniments of physical injuries, but now that we find 10-14 o o of casualties falling into the group of psychoneuroses we must extend our application of remedy for shock to such of these as are in urgent need.

The following description expresses the results of careful study and mature judgment of our ablest physiologists and surgeons. The sample directions are worthy of close attention:

The Warming of Shocked Men. There is unanimous testimony that loss of body heat is conducive to the production or increase of traumatic shock, and that warmth is an effective means of preventing shock, or lessening it when already established. The severely wounded man sweats even to a degree that may wet his clothing; he may have a diminished blood pressure from on-coming shock or hemorrhage: and he is liable to exposure during the examination of his wound and in the ambulance. All these condi-

tions lead to lowering of body temperature and thus to lessening of the chances of survival. To preserve or to restore normal body temperature the following precautions should be remembered: (1) In *examining wounds*, cover with a blanket the part finished before starting the examination of another part. (2) Badly wounded men suffering from shock or hemorrhage are usually thirsty. Give them *hot drinks*, preferably hot coffee, or tea, with sugar. Do not give alcohol in any form as its use aggravates and does not relieve symptoms. Avoid giving drinks if there is an abdominal wound with possible penetration of the stomach or intestine. (3) Use *three blankets* if there is danger from cold. To obtain the best service from them fold them in such a way that this provides for four layers of blanket beneath and four layers over the patient. A water-proof sheet around the blankets will ckeck loss of heat. (4) In placing *hot water bottles* keep in mind two considerations: that the rapidity of heat conduction depends on difference of temperature, and that more value is obtained from a hot water bottle by using both sides. For quick heating apply the warmth preferably to the coldest parts, i. e., to hands and feet. If only two hot water bottles are available, put one at the feet, the other on the belly with the hands over it. If three more are available place them between the arm and chest on either side, and between the thighs. In a " push ", when supplies may be insufficient, canteens temporarily taken from a salvage heap may be used as hot water bottles. Be careful to avoid a heat that may burn the skin.

(5) *At the hospital* set on a cot or a bed the stretcher bearing the patient. Between the cot or mattress and the stretcher is a space of about 5 inches. If the patient is cold and shocked, lay a blanket over him and let it fall down at the sides and at the foot of the stretcher; the space is thus enclosed except at the head end. Now apply heat at the foot end. This may be simply done by cutting a square tin box, such as is used for dried potatoes in the A. E. F., by supporting the box so that the upper opening connects with the enclosed space under the stretcher, and by lighting in the box three or more candles, or a small can of solid alcohol (partly covered if the flame is too great). In a stationary hospital with electricity a frame 3 feet long and 18 inches high may be constructed and wired for six electric lamps which project inward from the frame. The frame, set over the patient, is covered with blankets and the current turned on. The cot must be kept level; otherwise the heat will not be evenly distributed. *Do not overheat the patient.* He needs fluid and should not be caused to lose it by unnecessary

sweating. When he is warm, carefully remove his clothing and lay him in the warmed bed.

SOME SUFFERED THAT OTHERS MAY LEARN: GAS PREVENTION.

After a recent gas attack the following notes were made for the information of the chief Surgeon:

"The bombardment began at ten P. M. and lasted an hour, during which time shells were discharged at the rate of about 15 per minute. The night was warm and dry with a slight breeze blowing from the north which later changed to the northwest. Following the bombardment there was a lull of nearly three hours during which time occasional shrapnel and artillery shells were exploded. At about one A. M. the gas bombardment was renewed with increased vigor. This attack lasted about fifty minutes during which time gas shells were discharged at a greater rate than during the earlier attack. "Mustard" seems to have been the principal gas used, with a possibility of a slight mixture with other gasses.

The principal cases of the casualties during this attack are as follows:

(1) Delay in applying respirators, and their promiscuous removal during, and premature removal following, one bombardment.

(2) Relying on poorly constructed dugouts.

(3) Failure to awaken sleeping men.

(4) Permitting men to enter an old mill in the gassed area and to remove their masks.

After careful analysis of the conditions associated with this attack, it is the opinion that many of the casualties were the result of individual carelessness and to a certain extent poor Company Gas Discipline. Of course the fact must not be lost sight of that the members of these organizations had been heavily engaged with the enemy for the past two or three weeks, during which time they were subjected to many hardships which resulted in a general lowering of their physical condition, thereby rendering them in a fit state for the actions of poisonous gases. Nevertheless, considering everything in connection with this bombardment, the lowered physical condition of the men, the nature of the attack, darkness, heavy underbrush, poorly constructed dugouts and permitting men to enter a gas saturated building, etc., it is the opinion that with proper care many of these casualties could have been averted.

From interviews with casualties resulting from this attack, few seemed to be familiar with the question of mask removal during

the following gas attacks. Some were of the opinion that they removed their masks immediately after the bombardment ceased; others stated they did not remove them until they saw their officers without masks, and still others said they removed them at intervals during the bombardment for the purpose of obtaining better vision or because the respiration was uncomfortable. Few had received orders of any kind from officers or others relative to removal of masks.

The dugouts appear to have been one of the principal causes for the gas casualties. These dugouts from all accounts were but mere holes of different sizes dug in the side of the trenches, some capable of holding two men, others more; all were protected by hanging curtains made of shelter halves dropped in front. The men entered these places thinking they were safe and removed their masks; as a result many became gassed. Many men were gassed in an old mill which was in the midst of the gassed area. Following the bombardment the men entered this place, removed their masks and laid down on the gas-saturated hay-covered floor to rest. All stated the odor of gas was very strong at the time, but inasmuch as their officers were present without masks they thought the place safe. Many men were gassed because they were not awakened when the gas attack began. Others stated they smelt the gas long before any gas alarm was sounded.

Attention is again invited to the subject of long hair in connection with gassed cases. This matter has been taken up before and recommendation made that all men in the front area be compelled to have the hair on their heads closely cropped. I am firmly convinced that long hair on the head has much to do with the harboring of poisonous gases, thereby being responsible for many men being gassed after the removal of their masks. All medical officers interrogated relative to this subject are of the same opinion. It is again recommended that all men serving in the front areas be compelled to have their heads closely cropped.

Yes! it is admitted that Company discipline does not rest with the medical officer, but the line officers will measure the importance of medical necessities by the determination the M. O.'s put into their demands. Demand Prevention, i. e., Gas Mask Discipline.

Three Lung Irritants. — A Note from the Chemical Warfare Service.

All the gases that act as lung irritants cause essentially the same type of pathological effects. The damage to the alveoli of the lungs which results from their action is followed by the rapid onset of acute pulmonary œdema, and it is the accumulation of fluid in the lungs which constitutes the immediate danger to life, since it interferes with the respiratory change in the lungs and leads to severe want of oxygen, which is indicated either by deep cyanosis or by pallor and collapse. The deeply cyanosed or leaden colored facies, the quickened respiration, rapid pulses, restlessness and profuse expectoration make a clinical picture which is characteristic in the majority of severe cases.

Phosgene is one of the most intense lung irritants known. Though acute pulmonary œdema may develop with great rapidity after exposure to a very strong dose of phosgene, it is of the utmost importance to recognize that in the case of less massive doses a very striking delay, even amounting to hours, frequently elapses between exposure to the gas and the onset of severe symptoms, and that during this interval the case may complain only of slight discomfort and may appear to be in good condition. This delayed action characterizes many of the lung irritant gases.

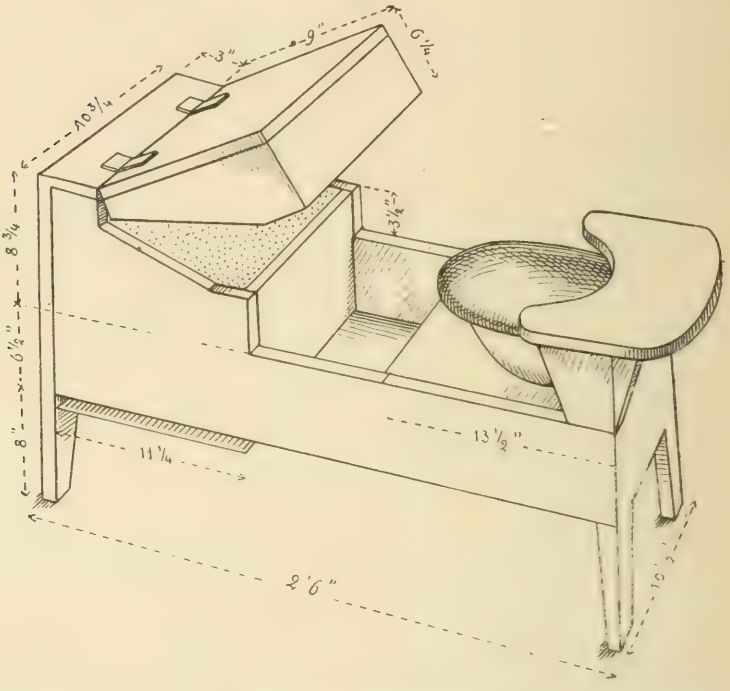
Chlorine : A much stronger concentration of this gas is needed to cause severe pulmonary œdema, or even lachrymation, than is the case with phosgene. It is far more irritant to the respiratory passages than phosgene.

Dichlor-Ethyle-Sulphide Mustard-Gas : Differs entirely from the above mentioned lung irritants. Phosgene kills directly and speedily by flooding the lungs with œdema fluid. Mustard gas kills at a later period, and death, when it does occur, is an indirect result of secondary lung infection, except in a few examples where the patient is asphyxiated by obstruction with bronchial sloughs.

Venereal prophylaxis.

What might be mildly dignified as a " System of Venereal Prophylaxis " has yielded such satisfying results in practice that it seems to be based on correct principles. The point of departure for both attendant and patient is placed in the teaching that " Venereal prophylaxis, being a major operation like catheterization, is entitled to professional consideration ". The attendant, therefore, must be placed in such a relation with the patient that the latter will see no humor in his position as a " Professor of Prophylaxis ".

This end is easily attained by establishing the Prophylaxis Station in a respectable, clean and well appointed location and providing such apparatus, in addition to the technical equipment, as will furnish the means of conducting the operation with at least as much dignity and formality as is practiced in a barber shop. Such an adjunct is provided in the form of a "Prophylaxis Stool" which requires the patient to assume the sitting posture, brings him



Prophylaxis Stool. In use at Camp Hospital No 16. Giving good service.

under the control of the attendant and permits a definitely outlined procedure which both the attendant and the patient may recognize and respect as an operation. A drawing of the prophylactic stool which has met these ends is presented herewith. The object of the device is two-fold.

(*a*) To provide a definite and simple means of bringing the patient and attendant into formal relation during the procedure of the treatment.

(*b*) To provide a convenient position for the patient which will permit a thorough application of the different steps of treatment without soiling the clothes or surroundings. The box compartment

is intended to hold the material and equipment when not in use and to place them in a convenient position for operation.

It has been found by practice that this stool makes it easy for the attendant not only to perform with integrity the several steps of his operation, but to grow so confident in his art and so interested in its practice that he becomes an efficient and enthusiastic instructor of interested pupils. The technic prescribed for the use of this stool is as follows: (From a circular issued by Commanding Officer, Camp Hospital 19.)

I. *The Duty of the Attendant.*

A Medical Department Attendant will be on duty at the prophylaxis station at all times. He will be definitely instructed in all details of the technic of prophylaxis by the Surgeon, who will inspect the pratice of the attendant often enough to assure himself the duties are properly performed. The prophylaxis treatments will be given by the attendant in accordance with the following directions. A patient will not be permitted to administer the treatment to himself. Before beginning the treatment, a prophylaxis card will be carefully prepared with the name of the patient and other entries. The signature of the patient will be written on the top of the back of the card. The identification tag of the patient will be inspected to verify his name and organization, if the patient be not known to the attendant. The Medical Officer in charge will inspect and sign the cards daily, to insure that all required data are recorded. If, for any reason, the attendant is unable to administer a treatment in the proper manner, in accordance with the prescribed method, he will write on the prophylaxis card the reasons why treatment could not be properly given.

II. *Preparation of the Patient.*

The patient will be required to urinate in the presence of the attendant immediately before the treatment is commenced. He will be placed in a sitting position with his trousers lowered below the knees, and a basin placed below and between his thighs so as to catch all fluids and to protect his clothing and the surroundings. A pint of warm water will be placed in the basin and the patient will receive a wipe of gauze with which to wash thoroughly his genitals with soap and water. The attendant will then examine the patient for discharge from the urethra and sores on the penis. If either of these conditions be discovered, a record of the observation will be made on the prophylaxis card. The attendant will drop slowly on the penis, from a bottle, about a tablespoonful of

liquid soap, while the patient thoroughly washes the penis with the wipe and the clean water in the pan. While washing is continued the attendant will see that the foreskin is retracted and that all parts about the head and body of the penis, together with the scrotum, are thoroughly washed. After the washing with soap and water is finished, the attendant will pour slowly on the penis from a bottle at least one half pint of a warm solution of 1 : 1000 bichloride of mercury, during which time the patient will thoroughly wash all parts of the penis in the same manner as directed above in using soap and water. The gauze wipe used in the washing will be placed in a proper receptacle to be disposed of later by a prescribed recovery process or by burning. The penis will be allowed to dry by evaporation while the injection is being given, as it is not advisable to wipe off the bichloride solution.

III. *Injection.*

The injection will always be given by the attendant. A few drachms of a 2 % protargol solution will be poured from the bottle into a small glass from which the syringe will be charged. One drachm of this protargol solution will be drawn into the syringe. The attendant will hold the meatus between the thumb and finger of the left hand, pressing from top to bottom, and place the nozzle of the syringe in the meatus with the right hand. The solution will be slowly injected until the syringe is empty, while the attendant continues to hold the penis. The patient will then take hold of his penis and relieve the attendant of any further part in the injection. The patient will hold his penis, so as to retain the solution, for five minutes by the clock, being careful to press only on the extreme end so as to allow the fluid to come into contact with all parts of the urethra. The meatus should be held only tightly enough to retain the fluid while allowing an occasional drop to escape. This precaution of not holding the meatus too tightly is very important because the location of the infection is liable to be in the very end of the urethra, and compressing the urethra too tightly prevents the solution from coming into contact with the very surfaces where infection is most likely to occur.

After the time limit of five minutes has expired, the pressure on the meatus is released and the protargol solution is allowed to escape without pressure on the urethra to expel the last drop which it is desired should remain.

IV. *Inunction.*

If the penis is not perfectly dry after the washings with bichloride solution, the patient will receive a newspaper towel with which to dry it thoroughly. The attendant will remove from the small container, by means of a small wooden spatula about two inches long, one-half drachm of a 33 1/3 % calomel ointment which he will smear over the surface of the penis while the patient retracts the foreskin and turns the penis so that the ointment can be applied to all parts. After the ointment is transferred from the spatula to the penis, the spatula will be placed in a proper retainer to be burned. A new spatula will be used for each case and the old one will always be destroyed. The attendant will make these spatulae from suitable pieces of wood.

After the ointment is thus applied to all parts of the penis by the attendant, the patient will carefully and thoroughly rub the ointment into all parts of the skin covering the penis, being very careful to withdraw the foreskin and to make the rubbing very thorough about the meatus, head and neck of the penis. This rubbing should be continued until the ointment has disappeared, leaving only a colorless greasy film on the skin of the penis. While the ointment is being rubbed into the forepart of the penis, a small portion, about the size of a pea, will be pushed into the meatus and left there. Any excess of the ointment which remains will be rubbed towards the base of the penis and the scrotum. After the inunction is completed and remains as only a greasy film on the skin, the foreskin will be drawn down over the head of the penis.

The attendant will then provide a piece of toilet paper, of newspaper, with which the patient will wrap the penis to prevent the ointment from being rubbed off and to protect his clothing. The patient will be directed not to urinate within a period of 4 or 5 hours after the treatment. Liquid soap, water and a newspaper towel will be provided by the attendant to permit the patient to wash his hands, by which operation the treatment is completed.

V. *Materials.*

The *syringes* will be sterilized by boiling whenever practicable; otherwise each syringe must remain in a solution of 1 to 1 000 bichloride of mercury for at least one hour after it has been used on one patient, before it may be used on another. One dozen syringes should be furnished to provide a capacity of one dozen prophylaxis treatments in one hour, when sterilization is effected by the antiseptic solution. When the syringes are sterilized by

boiling, 10 minutes in boiling water is required for preparing a syringe to be used again after it has once been used.

Two vessels will be provided for holding the syringes, one for sterilized syringes ready to be used, and the other for used syringes awaiting to be sterilized. Each vessel should contain 1 to 1 000 solution of bichloride of mercury, some of which should be drawn into the barrel of the syringe. The bichloride of mercury solution in the vessels containing the syringes must be changed every day.

The *bichloride of mercury solution*, (1 : 1 000) used for washing the penis, preparatory to the injection, should be kept in a bottle with a split cork so that the solution can be freely dropped. Several bottles should be filled so that a sufficient supply will always be at hand.

Liquid soap will be kept in a bottle with a split cork so that the soap can be freely dropped.

The wooden *spatulae* will be kept in a clean closed vessel or a corked bottle of appropriate size. They may be sterilized by boiling or by 1 : 1000 bichloride solution. A Medical Department enamel spit cup with cover makes a suitable vessel for this purpose.

A sufficient supply of a 2 % *protargol solution* should be kept in a stock bottle. A small glass or dish, holding not more than a few drachms, from which the syringe is filled, should be provided. Only a quantity sufficient for filling the syringe at one time should be poured out of the bottle into this vessel, which should be emptied and thoroughly cleaned after each period of treatment.

The *ointment* in stock should be kept in a covered jar in which it is issued. A small, covered, service jar will be used, from which the ointment required for each treatment will be taken. This service jar will be filled from the stock jar as often as required so that the stock jar will not be opened for each treatment. A regular Medical Department issue white enamel covered spit cup, containing a glass or jar small enough to fit in this spit cup, will be found most convenient for this service. (Details of Quarters, Furniture, Equipment to be given in next issue)

Prophylactic Station.

Quarters and Furniture: A comfortable waiting room should be provided adjoining the treatment room in which patients awaiting treatment will be protected from the weather. The prophylaxis treatment room should be well furnished with an appropriate table upon which the treatment materials are placed, and a cupboard or suitable shelving for storage of stock, in keeping with the standard

of a well appointed surgical dressing room. A urinal placed at proper height (2-1/2 ft. from floor) for convenient service should be provided. Toilet facilities should be provided to permit the attendant and patient to wash their hands after each treatment.

A suitable vessel should be provided for the reception of the gauze or cotton wipes and spatulae, after they are used, from which they are removed to be burned. The police, order and appointment of these rooms should be maintained in accordance with the standard of a well conducted hospital. The attendant should be as cleanly dressed and as neat in appearance as he should be for the performance of this duty as a competent ward attendant.

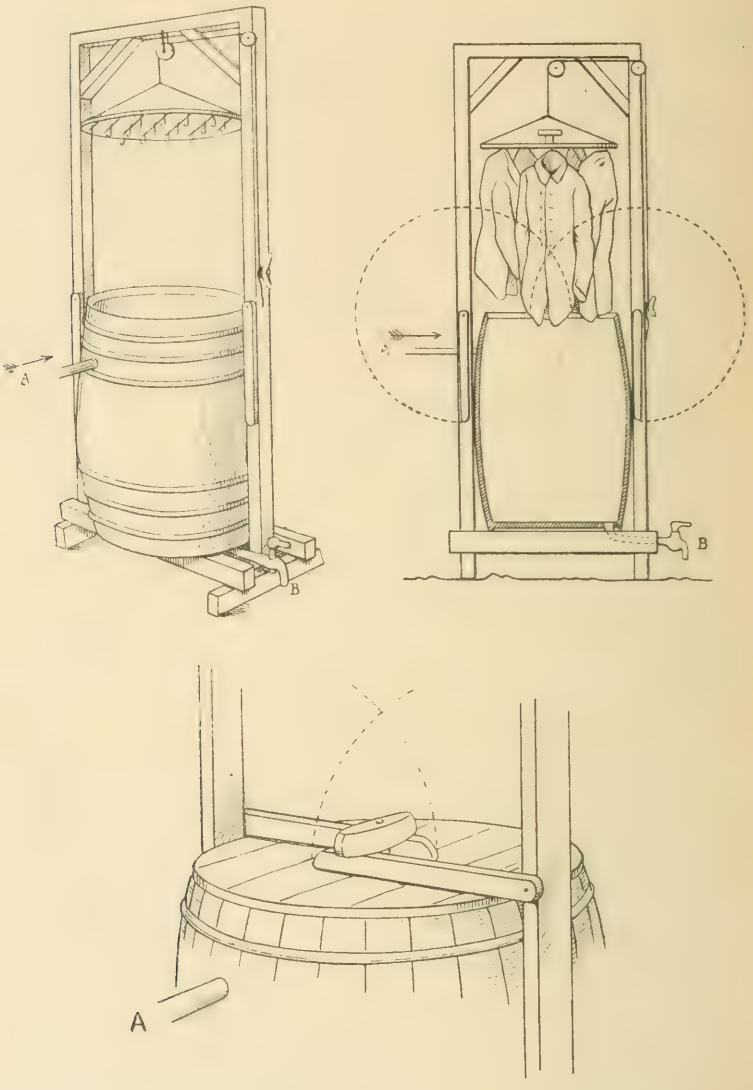
Table of Equiment : The following table recapitulates the minimum equipment required for a permanent prophylaxis station.

	Number
Stove, alcohol or kerosene, for sterilizing	1
Sterilizer, with cover, sufficient size for 1 dozen syringes	1
Container for sterilized syringes	1
Container for used syringes	1
Small vessels for protargol solution	2
Basins, enamel, medium size	4
Bucket, for a supply of warm water	1
Bottles, 1000 cc. for bichloride solution	1
Bottles, 1000 cc. for liquid soap	2
Bottles, 1000 cc. for protargol solution	1
Penis syringes	12
Spatulae, wooden, for applying calomel ointment	50
Toilet paper, package	1
Newspaper towels, size 1/4 of a newspaper page	100
Toilet paper rack	1
Newspaper towel rack, consisting of a board the size of the towel with two nails after the form of a Shannon file	1
Urinal and stand	1
Dressing table	1
Cupboard, with shelves	1
Towels, linen, for attendant and cleaning	12

Pyodermia Decreasing.

One of the important causes of *days lost* to the army has been in the A. E. F., as with the Allies, the group of secondary skin infections due to neglect of early stages of infestations with vermin, scabies, and lice, and to bodily uncleanliness. In many of the divisions at the front and in one of the large administrative districts of the S. O. S. the pyodermias have ceased to exist owing, we are informed by the dermatologists who especially delight in the refinements of nomenclature, to the following simple procedure. At venereal inspection twice each month all men strip to the

waist and drop breaches to knees. A glance at axillae, elbows and



Improvised dolousing barrel. An ordinary wine cask as steam chamber. Inlet pipe near top "A". Steam from high pressure boiler or with steam exhaust of ejector of horizontal autoclave. Outlet pipe "B" at bottom to allow air to escape and to avoid water of condensation. Barrel rim lined with felt for tight joint. Clothes hung on hooks on lid. Big stone on lid or wooden cleat and clamp permit slight positive pressure within.

buttocks supplements the examination of the penis. An interested sergeant can be trusted with the skin inspection while the surgeon

hunts for venereal lesions. A dermatologist should attend these inspections whenever practicable. In one month pyodermias ceased to exist in one large administrative district. The bath is another important place to catch the elusive parasites, and unless bathing is organized and adequate the men have not had the 88 o/o chance to escape infestation to which they are entitled. Here is a case of good bathing where inspection is part of the job : Enlisted strength of Battalion 1952, baths given (in one week) 2488, "C. C.'s", cootie cases, found 26, scabies cases found 5.

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